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Volume 17 May 1948 Number 5

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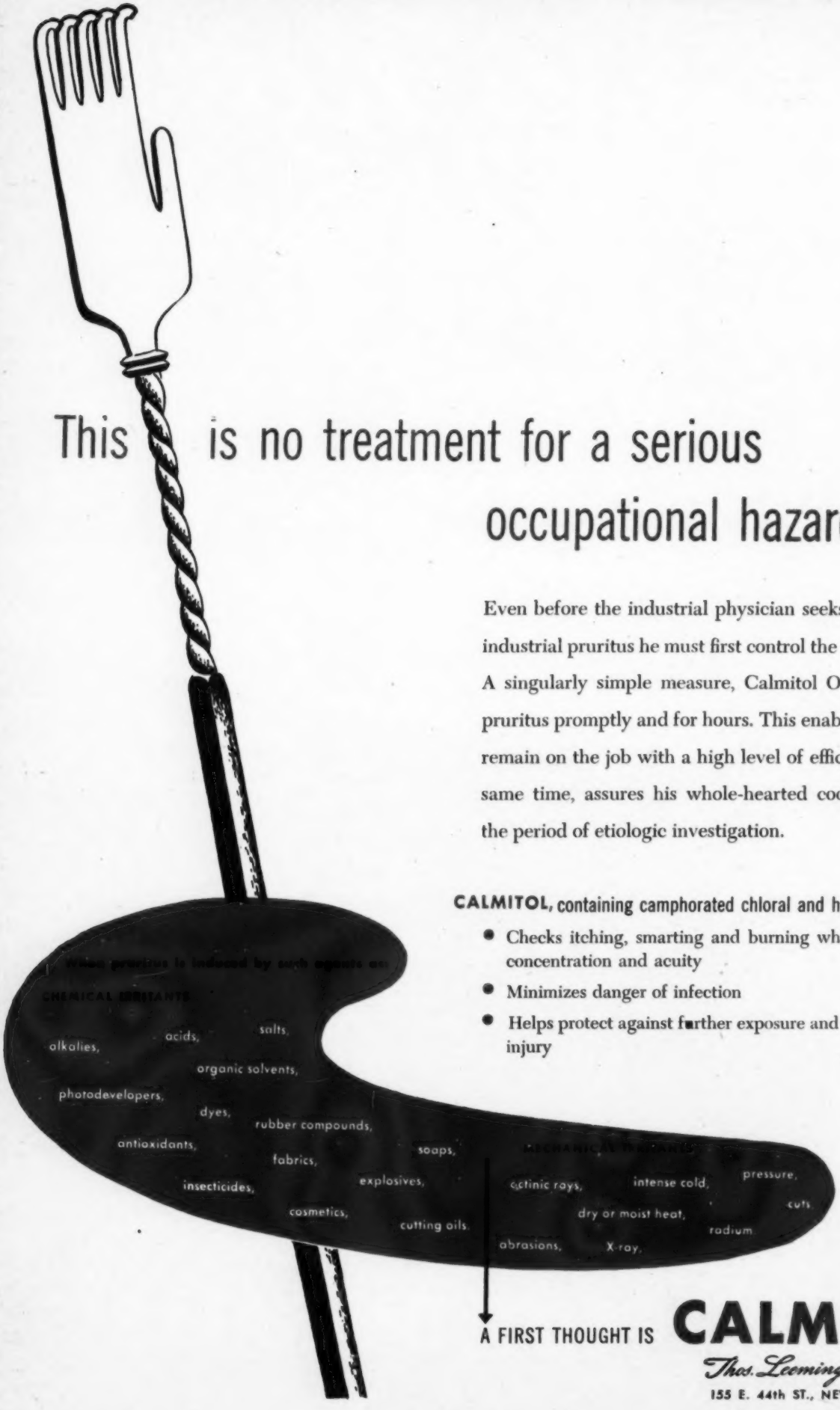

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This magazine is published to promote sound thought upon and concerning industrial medicine and traumatic surgery. To that end it will contain articles, news items, reports, digests, and other presentations, together with editors' comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited. The editors will exercise care in checking on the accuracy of data printed but in all other respects articles and opinions of which expression is allowed are the opinions of their authors—the editors reserving in all cases the right to comment on the same in the current or any subsequent issues as they may be inclined.

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NEWS

DR. ROBERT CLINTON PAGE, who has been Assistant Medical Director of the Texas Company, with offices at 135 E. 42nd Street, New York City, has recently been appointed Medical Director of Arabian-American Oil Company, Dhahran, Saudi, Arabia.

DR. SIDNEY REPPLIER, Medical Director, Curtis Publishing Company, Philadelphia, writes that DR. PAUL B. VAN DYKE is now assistant Medical Director of the Company on a full time basis.

DR. GRADIE R. ROWNTREE was appointed Medical Director of the C. T. Dearing Printing Co., Louisville, Kentucky on January 1, 1948. He has established a medical department at the company's plant and inaugurated a well-rounded health service for the employees, with emphasis on prevention. DR. ROWNTREE has been in public health work in Kentucky for the past 15 years and, in addition to being Medical Director of the C. T. Dearing Print-

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ing Company, he is Associate Professor of Preventive Medicine and Public Health, and Chief of the Section on Industrial Medicine at the University of Louisville, School of Medicine.

DR. WILLIAM H. SLAUGHTER, senior ship surgeon of the Matson Lines, has been appointed ship surgeon of the new SS. LURLINE. The appointment is announced by DR. G. D. DEL PRAT, company medical director. DR. SLAUGHTER, formerly a commissioned officer of the U. S. Public Health Service, has served on the SS MONTEREY and since December 1946, has been surgeon on the SS MARINE PHOENIX. On board the new LURLINE, when she sails on her maiden voyage April 15, DR. SLAUGHTER will have charge of the ship's new, modern hospital which has the best in modern equipment and even has its own air conditioning system. The office of the ship's physician, located on D deck, has a waiting room and examination room complete with modern equipment. The doctor's quarters are outboard of his office so that he is available at all times. The hospital, on E deck, has a complete operating room and three wards, one for women, one for men and a third for crew members. The hospital staff includes registered female nurses and a hospital attendant, who is also a male nurse. Before each voyage every member of the crew is examined by the ship's physician to insure a clean bill of health for the personnel of the ship.

DR. EVERETT W. PROBST has been appointed Medical Director of Remington Rand Incorporated. He will have charge of the dispensary at the Elmira plant and will coordinate the industrial hygiene and medical services in all the other Remington Rand plants throughout the entire country. DR. PROBST was formerly Medical Supervisor of the Arlington, New Jersey, plant of E. I. du Pont de Nemours & Co. and for a short time was assistant manager of the Industrial Toxicology Department of Union Carbide and Carbon Corporation. He is a graduate of Lafayette College and New York University Medical College. During the war, he directed the Industrial Medical program for 20,000 employees at Picatinny Arsenal, Dover, New Jersey, and left the services with the rank of Lt. Colonel. He is a member of

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DR. C. D. SELBY, Medical Consultant, General Motors Corporation, acted as chairman at the Wednesday afternoon, May 6, session of the Sixth Annual Meeting of the National Council on Rehabilitation at the Hotel Pennsylvania, New York, the subject of the session being "Making Rehabilitation Work." DR. HENRY H. KESSLER is president of this Council.

London Congress of Industrial Medicine

ABOUT 40 copies of the program for the Ninth International Congress on Industrial Medicine to be held in London, September 13 to 17, 1948, are available to those interested. Write the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS at 28 E. Jackson Boulevard, Chicago, or DR. W. A. SAWYER, 343 State Street, Rochester 4, New York. Application blanks are also available to attend this very comprehensive congress of six separate sections, each having from four to nine sessions on a special phase of industrial medicine. To attend, your application, reservations and transportation accommodations should be completed before June 1.

Successful Course

THE Fifth Postgraduate Course in Industrial Medicine, at Long Island College of Medicine, Brooklyn, which began on April 5, was successfully completed on April 16. The total enrollment of full and part time students was 75, the second largest of all the colleges postgraduate courses in this field. Thirty-one of the matriculants were physicians, 26 were nurses and 18 were members of other professions. Students from three foreign countries, Belgium, China and Egypt, also were present. Representatives of 26 different organizations in six different states attended the course.

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1. Lehr, D.: Proc. Soc. Exper. Biol. & Med. 64:393, 1947.

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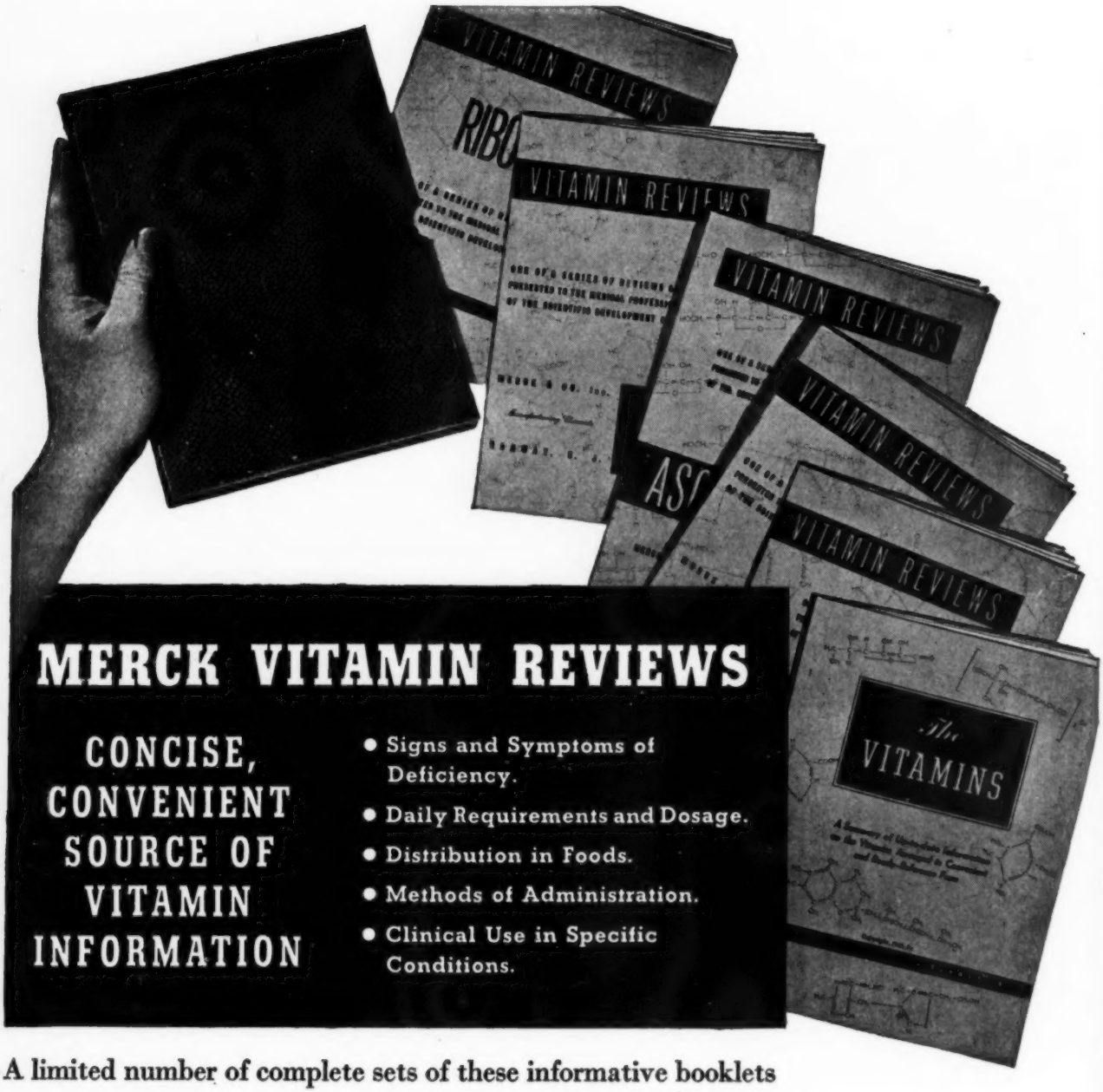

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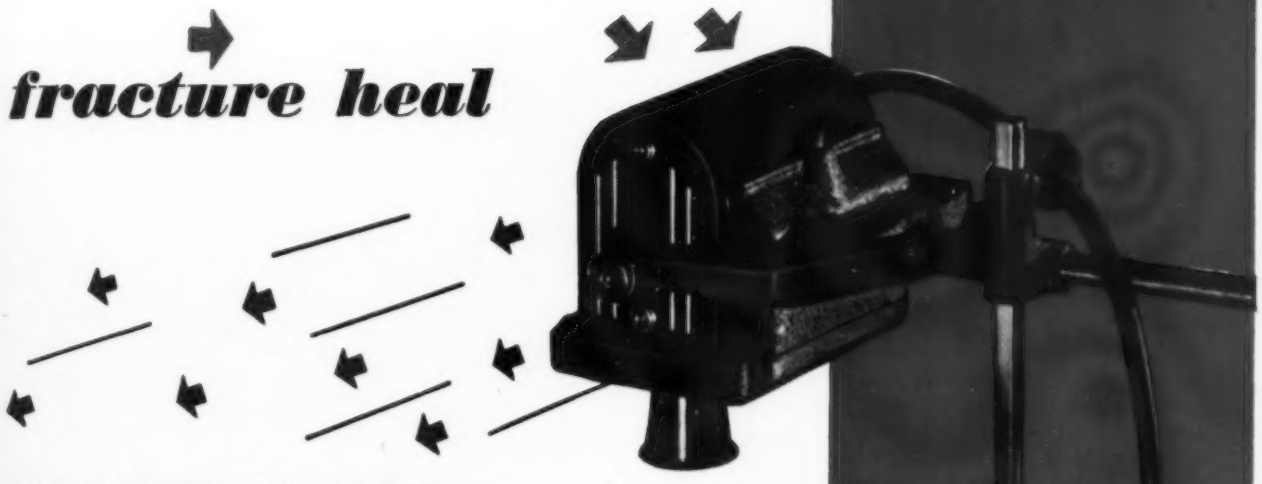

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INDUSTRIAL MEDICINE

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Alcoholism in Industry

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I AM NOT going to talk about alcohol, and I am not going to talk about drinking. I am going to talk about alcoholism which is a very different thing indeed. The first question to discuss might arise from the fact that this is probably a subject which has rarely been mentioned or even considered for a place on the program of your association or of almost any similar association. Alcoholism is not and has not been a subject which physicians have given much, if any, attention. The same may be said of personnel directors, of social workers, of psychiatrists and, in fact, of the public as a whole.

This general absence of serious interest in alcoholism is of considerable significance in trying to assess the current state of affairs in relation to alcoholism in industry. It is impractical to expect one or two groups in society to plan and to act in ways that are foreign or even objectionable to the rest of the society, and until the last two or three years at best, alcoholism was a phenomena which was not only completely misunderstood but which was also characterized by wildly emotional response or by sullen indifference as far as the overwhelming majority of the population was concerned. These responses and these attitudes were as common in industry as they were in the medical profession, in research, in social work, in commerce, in religion or elsewhere.

To begin, I had best try to define alcoholism, and I will have to cover this area, admittedly, very, very briefly. First of all, alcoholism is a progressive condition. Except for a handful of individuals who would probably be labeled psychotic, a period of from two to ten years exists from the appearance of early symptoms to the establishment of the full-blown syndrome. The rest of my definition will refer to those who are in the later or final stages of this condition.

The population to be described consists of about 4,000,000 persons, which is about 6% of the total drinking population in our country. Five-sixths of the people concerned are males and about the same proportion are between the ages of 30 to 60. Now the first characteristic, which is true of all these 4,000,000, is what may be loosely termed a general social psychological maladjustment. It takes no greater expert to discover this maladjustment or to see that it is intimately connected with excessive drinking. On the psychological side one observes the immaturity of response of these individuals. This is made manifest by the great discrepancy they show between their plans or ideas or promises on the one hand and their accomplishment, which is always so small, on the other hand. It is also manifested by their rapid mood swings from optimism to pessimism. It is to be seen in their almost juvenile lying, conniving and rationizations.

Many of their behavior patterns are acceptable or mildly laughable, perhaps, in adolescents or young people, but in those of 30, 35 and 40 they are considerably disturbing. Also on the psychological side, we can see quite clearly the egocentricity which characterizes so many of them. By this I do not refer to conceit, although they may be very conceited, but to the fact that they are interested in themselves and in their lives to the exclusion of all other subjects and all other people.

They may be seen as individuals who have erected a wall, intangible, but nevertheless highly powerful and effective around their inner personalities, a wall which keeps them from caring about or paying any attention to, and certainly as far as giving anything is concerned outside of themselves, and a wall which acts as a barrier between them and normal stimuli, punishments, rewards and activities which come from the outside world to us. Their self-pity is almost psychopathic.

To describe them on the more sociological or social side, a great preponderance of these individuals are desocialized or unsocialized. This is particularly true when it comes to membership in those small, intimate, emotionally significant groups, such as the parental family, the marital family, and friendship cliques. The alcoholic is unmarried usually, or divorced, separated, has acquaintances not friends, and is out of touch with his parental family. Furthermore, if a job or recreational or professional association tends to become personal or emotionally meaningful, or involves reciprocity, the alcoholic will usually get out.

Presented at the Thirty Third Annual Meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, Boston, Massachusetts, March 31, 1948.

The alcoholic, in addition to his poor membership, tends to have ideas and attitude, which vary widely from the average of those in a similar position in society. In relation to activities, the alcoholic tends to do some bizarre things and, in many instances, to do what the rest of the public calls "nothing." I can merely suggest that these two types of maladjustment, the social and the psychological re-enforce each other. That is, the man who is socially isolated tends to become more sensitive, less controlled in moods, more easily a boaster, a defeatist, an idealist or a despondent introvert. On the other hand, the more self-conscious individual, the more sensitive individual, the individual who engages in less activity, has rather invert attitudes, finds himself increasingly uncomfortable in groups and finds it increasingly difficult to join new groups. So we have a psychologically and socially maladjusted person who is meeting many of his problems by a chronic and continuing use of alcohol.

Along with this social-psychological maladjustment there may be physiological adjustments, and here I refer to physiological or physical maladjustments not directly the result of alcohol but more directly the result of the life lived by the alcoholic or pre-alcoholic. So many chronic, excessive drinkers have very poor, very irregular nutrition, very poor, very irregular sleeping habits. They live under constant psychological tension. They are highly susceptible to disease, especially respiratory disease, and, of course, they are highly susceptible to accidents. Furthermore, it takes them a longer time to recuperate.

With this sort of maladjustment picture it is not difficult to see, although this is not generally believed by the public, that the life of the alcoholic is far from a happy one. Most are afflicted not only by the obvious physical, social, psychological problems which I have already mentioned, but in addition, and more importantly perhaps, they are afflicted by deep feelings of guilt and remorse and self-depreciation. These some times are so marked that the technical word "depression" may be used to characterize it. The use of alcohol by these people reminds one of the classic vicious circle. Although alcohol gives temporary release it increases the depth and complexity of their problems in the long run, and as it does so they need more temporary release and so it goes.

Now there are two other general characteristics of the alcoholic in the later stages, and these present us with means of classifying the alcoholics into three large groups. The group, which only has the maladjustments I have just spoken of, is sometimes called the *chronic excessive drinker*. The next characteristic concerns motivation in drinking. With the whole group the motivation differs sharply from that of the social drinker. The alcoholic needs alcohol to make life possible, to allow any satisfactions, and to escape what is for him a painful and threatening existence.

For many alcoholics this need has become uncontrollable by ordinary means. They do not mean to have any drinks, and in two minutes they are out on a binge. It is quite true that that may be a real surprise to them. These men will fight against having a drink in some instances. Many of them despise liquor and hate themselves for drinking and hate drinking. They will fight; they will exert tremendous effort, exhibiting both physical and psychological symptoms in their struggles which are unmistakable in their sincerity and in their alcoholic to use will power, is compared with the intensity, but they get a drink and then they get 20. Sometimes when the will power of the perhaps well-intentioned friend who urges the alcoholic to use will power is compared with the gigantic effort that some of these drinkers will make, one is at the least given cause for thought.

Naturally this lack of control does not appear all at once. When it is clearly present we speak of the *compulsive drinker*. Finally, when there is in addition to the social-psychological maladjustment and in addition to the compulsive drinking a really diagnosed disease, mental or physical, which is directly related to the action of the alcohol, then we speak of the *chronic alcoholic*, a technical term. This individual may have an alcoholic psychosis. He may have very bad liver damage, both due directly or very closely to the action of alcohol in its chronic use, excessive use.

There are about 750,000 of these chronic alcoholics. There are probably about one-quarter million of the compulsive drinkers, and there are about 2,000,000 chronic excessive drinkers. The figures on these last two groups are not good. They are careful estimates, probably on the low side, but it is very difficult to make out these figures. The first figure of the chronic alcoholic, is a good figure. Because of certain weaknesses it may be low but we know that it is not too high.

Now time is going to allow only a very brief statement on etiology. Then we will have to turn to the impact of this condition on industry. Speaking in general terms, we can classify the bulk, not all, but the bulk of this population under two headings. Those who were noticeably, rather badly or very badly adjusted personalities before they ever started drinking; and, secondly, those who were not noticeably maladjusted persons before they started drinking. Perhaps the word "neurotic" will help to indicate the meaning implied for the first group.

Here are the young men and women who have problems of self-assertion, sexuality, aggressiveness, self-evaluation or of getting affection from others. Whatever it is, the problems are so great that by late adolescence or young adulthood they show behavior and attitudes which mark them from other people. They retreat from competition in situations in which competition is socially demanded, or they try to escape from people, or they are terrified of their own aggressive feelings, or they noticeably over-compensate.

Alcohol is a socially acceptable depressant which can temporarily relieve one of painful memories, of inhibitions, of sensitivity, of unpleasant self-controls, and it acts as a wonderful cane to support these people. It does not, however, do more than temporarily relieve them, a relief which may greatly increase the guilt and insecurity, a relief which cannot affect the original source of their problem.

This cane can very easily develop into a crutch. It might even be said that some of these people have hollow legs in more senses of the word than one. They lose the ability, in a personality sense, to work without alcohol. This category may be called the *primary compulsive type.* The *secondary type* had problems during infancy, during childhood, during adolescence, and young adulthood, and so did we all. However, their particular adjustment was not such that they were marked off or set apart by others on the surface. They were fairly well adjusted. They went through school or college. They dated girls and married. They participated in sports and associations. Perhaps some of them, looking back, seem to have overdone it a bit, that is, they were the best salesmen. They were also the leaders in the college dramatics or sports or whatever it may have been. That isn't always the case. In any event, they were for their group fairly heavy drinkers, not drunks, not alcoholics, but fairly heavy drinkers.

What is called the pampering effect of alcohol played a large role in their progress toward alcoholism. At first with a few drinks, from two or three drinks perhaps in the evening, they were a little careless in their relationships with others. Remember that even the smallest amounts of alcohol slow down reactions, reduce discrimination, lower sensitivity, and allow the individual to forget unpleasant things. This is very useful. This is why everybody drinks, but with these people it began to play a rather significant role so that they could be a little more selfish. Perhaps they could exhibit just a little more aggression than they were able to do without that alcohol.

Now the individual concerned did not see this, did not believe it. If you bring it up to him he may even aggressively deny it. Perhaps you have had the experience yourself of being at cocktail parties and noting that maybe with just one or two drinks other people sometimes are just a little cleverer. Perhaps even your own jokes sound very good. Everybody can be quite easily amused. Your discrimination is down. These particular people I am speaking about find it very necessary after a while that that discrimination be down and that it be down a good part of the time, not just at cocktail parties but in the ordinary routine of life. It is easier to live that way, of course, but it gets you into trouble.

If this man's drinking extends a little further in time, that is, starts at noon instead of at five in the afternoon, it is taking place six nights a week instead of two or three nights a week, that pampering effect begins to extend itself over a little more and a little more of his life, and he is allowed more careless, more self-centered activity, and at the same time, which is very important, the individual is getting less practice in self-control, in socially acceptable activity, in contractive relationships, and interpersonal antics of ordinary human life, and the lack of that exercise begins to dull the sharpness and the acuity of his personality assets. Remember this person is not drunk. He may get drunk now and again. He may get drunk every other weekend, let's say, but he is just living a little more easily, a little more simply all the time, and since this difference is not preceived by him it makes life much easier for him.

Trouble is going to start on this level. Trouble is going to start at home with the wife and with the children, and with certain business associates in the afternoon, and with anybody who is on a recreational basis, but it will be very imperceptible and very gradual. It may be two or three years before the trouble is precipitated into an overt incident. When that takes place the chances are good that this person will solve his problem, that immediate problem, in the way he had learned to solve all problems: He will begin to take alcohol to cure the effects of alcohol. Then he is beginning on his way and he is going a little faster. This is very gradual. It will not be noticed. It will not appear, perhaps, to his associates, employers or to his employees, and his acquaintances for quite some years, but by imperceptible degrees he is becoming dependent on alcohol.

While he is doing so he is losing his assets, his personality assets. He is beginning to lose friends. He is getting suspicious of them. He is not doing quite so well on the job. He may be talking more and more about what he has done and what he is going to do. He is beginning to look a little like that primary type of drinker, that neurotic person. Close immediate relationships are becoming threatening to him because of criticisms that arise and suggestions—most of them utterly useless, of course. Toward the end of the development he may look just exactly like the primary type and only a diagnostically trained person can make the distinction.

This distinction of the primary and secondary type is highly significant for therapy. It is also highly significant for industry. One of these types presents an excellent prognosis for recovery, a recovery which need not be expensive in time or in money. The other presents a poorer prognosis and calls for a therapy both time consuming and expensive. Although any statistical proof is lacking, I would suggest that one of these groups is far more prevalent and certainly far more significant for industry than the other, and that is the secondary group.

The introductory remarks, that alcoholism is an important problem for industry, is not even a debatable matter. Unfortunately, it is almost

equally undebatable that until, let's say, 1947, industry, as such, had failed to recognize that fact. I say almost equally because during the last two years a change has become observable. Three or four large industries have not only recognized the problem, but have done something about it. Perhaps another 25 industries have had the matter brought seriously to their attention. Two weeks ago a two-day conference, for instance, was held in Chicago for industry on the problems of alcoholism in industry, and today a section of your association is hearing something about the same thing. The reasons for this long prevalent attitude are not hard to find, nor it is difficult to understand why there was an objection on the part of management to consider the matter, or why, if they were asked, "Is alcoholism a problem in your industry?" there would be a brusk or even an aggressive negative. Those who asked such questions were thought to be—and probably were—raising a moral, a political, or a personal issue. There wasn't anything that could be done about it anyway, and furthermore, most large industries had policing systems which were sufficient to keep acutely intoxicated persons off company grounds. This hid the problem effectively from management. Finally, as indicated earlier, neither personnel experts nor medical men were any more interested in the problem than anybody else.

Is alcoholism a problem for industry? Well, of those 4,000,000 persons who are afflicted, all of whom are characterized by this social and psychological deterioration that I spoke of, 85% are men, and of these about 85% are between the ages of 30 and 60. In other words, about 2,890,000 men between 30 and 60 are so afflicted. The total male population in this country between 30 and 60 is approximately 28,500,000. This means that about 1 in 10 of the men between 30 and 60 are involved. Now some of these men from the point of view of employment are either unemployable or available only for the most unskilled, unresponsible, and usually temporary sort of jobs. Some are still hanging on to jobs, although their progress is undoubtedly and undeniably down hill. No one of them is at the peak of his efficiency, potential efficiency, or anywhere near it.

Now, just in case anybody thought I said that 10% of the industrial manpower was affected, let me remind you, women were completely eliminated from this analysis as were males from 18 to 30. This 18 to 30 year old male group today amounts to about 15,000,000 persons. The number of alcoholics, however, is much, much lower, well below one-quarter of a million. So the percentage for just the male population is about seven, and when employed women or employable women are added the percentage, of course, sinks even lower. The age range 30 to 60, however, is the age range par excellence for alcoholics. The largest of any group is between the ages of 38 and 43.

The age range of 30 to 60 is not without significance for industry. In wartime it is the age range par excellence for industry. The loss in potential caused by the condition of these hundreds of thousands of men is a serious problem to industry under wartime conditions. This is a gigantic loss but it is intangible. Furthermore, it affects all industry, but it rarely seems to affect any one. What about the actual losses of particular industries? This is a difficult question to answer. Why? Because industries don't record the facts. Because employees, employers, and the public generally take pains to hide the facts. Absences in industry are recorded because of colds, backaches, heart attacks, nervous breakdowns, rheumatism, because of misunderstandings, death in the families, accidents, loss of transportation, perhaps even grandmothers' funerals.

In how great a percentage of these cases is alcoholism the only cause and in how many cases is it the predominant cause? In how many cases is it the partial cause? I don't know. I have it on fair authority that in many instances Monday mornings show a heavy incidence of colds, and knowing something about alcoholics, I may be permitted at least a high level of suspicion. I do know that about 1,370,000 of this total population of chronic, excessive and compulsive drinkers are fairly regularly employed in industry—*one million three hundred seventy thousand.* Maybe they aren't employed constantly by the same employers. I do know that these 1,370,000 are more susceptible to diseases than the rest of the population. I know that they take longer to recover from accidents and diseases than the rest of the population. I know that they are living under a higher psychological tension than the rest of the population.

For those of you who like figures there is one set of figures I can give you. These figures refer to work days lost by those who are employed in industry, work days lost from one cause only. Now the cause I speak of is technically known as acute alcoholism. That is a very pompous way of saying "being drunk." Remember that these more or less regularly employed persons in industry lose time for a multitude of reasons, many of them closely connected with their alcoholism. They leave jobs. They switch jobs. They miss days on the jobs. But I am speaking about only one thing—working days lost due to one cause by alcoholics employed in industry. These industrially employed alcoholics average 22 working days a year absence due to acute alcoholism. That means that just short of 30,000,000 working days are lost to industry by these 1,370,000 workers. This is no small loss to any industry.

Naturally the loss suffered by society as a whole from alcoholism is very great. However, the loss falls unequally on different segments of society. The fields of economics and industrial management and also the professions suffer a very special loss because of the age range most common for alcoholism, also because of this

progressive nature of the disease. The reason will be very clear to anyone here who is in personnel work. In any large industry there is considerable range of skills, duties, responsibilities required by various positions. As the ability and the experience demanded by a job increases so does the importance of the man. In most industries the worth of a man increases with his increasing maturity and his accumulating experience. For this reason many industries are really putting more into their employees, those whom they expect to achieve higher positions, as an investment during their first years of employment, during their first three, four or seven years. Then in the following 10, 20, or 30 years they expect their real returns. This, of course, does not apply to the low skilled, low responsibility jobs.

If alcoholism hit individuals at 20, 23, 24, 25, 26, industry would not take a terrific loss, nor would the professions, nor would commerce. Unfortunately, the first stages of alcoholism usually appear at about age 30, and alcoholism does not become obvious until 33, 34 and 35. This means that the industry may be said to have invested money and years in the development of potential leaders, technical, highly skilled people in all sorts of jobs. Just as the person should be developing into a valuable person his or her work begins to show the effect of those early stages. The company may try to keep the man on, to salvage him, to give him several "last chances," to send him off on vacations, to move him from this plant to that plant. Of course, the alcoholism is always in the person and none of these chance experiments are going to work. After a short history of this sort, out the man goes, usually after creating greater or lesser headaches for the company and for all the individuals concerned.

One more point should be made. Alcoholism, no matter what type, is a chronic condition. It is not comparable to a fracture or the measles or a cold. Alcoholism almost invariably remains for the rest of the person's life, and his economic as well as other social and psychological capabilities steadily and surely deteriorate. Alcoholism does not make a man unfit for this job or for that job. Alcoholism makes a man unfit for any kind of work to say nothing of his effect on other workers.

The point made earlier about the significance of the secondary type of alcoholism to industry can be clarified. The obviously neurotic person who turns to alcohol usually shows his alcoholism early and by definition shows his neurotic responses early. Management can discover this sort of person in the early days. Industry will soon have him earmarked as being of lesser potentiality or will have gotten rid of him. They will have evidence of his irregularity and personality limitations almost from the start. It is the secondary type which is going to cause the great loss for industry.

I should add this comment. Industry, like every other portion of the community, is affected by the costs, if nothing else, by the costs of courts, police, jails. Sometimes as low as 65%, but from 65 to 80% of the population of all the county jails and workhouses in the country is made up of those who are in time and time again for problems with alcohol. That is pretty expensive. It affects industry; so do the costs of public, private, religious, social and welfare agencies; so do the costs of broken families, of public damage, of assaults, of accident wards in hospitals, and on and on. These are costs which probably run in the neighborhood of hundreds of millions a year, and they are usually assessed at billions a year. These costs also affect industry, but, of course, only indirectly. So much for the problem.

Is there any answer? More specifically, is there any answer which is relevant to the needs of industry and which is practical for industry? Yes, there is an answer relevant to the needs of industry and it is practical. Alcoholics can be rehabilitated. There are literally thousands upon thousands of cases to give evidence to that statement. Are alcoholics worth rehabilitating? In my own mind there is only one answer to that question. The worth is not to be measured in terms of humanitarianism alone, not only in terms of public health, nor even only in terms of eventual prevention, but prevention, to be effective or lasting, will come through and along with rehabilitation, not through high-sounding exhortation or by legal decree. The worth can also be measured in terms of dollars and cents.

Our experience with clinics for alcoholics indicates that rehabilitation costs average either $90 or $140 per case, depending upon whether we use outpatient clinics or combine outpatient and inpatient clinics. If the lower figure, the outpatient clinic alone is used, the proportion of recoveries is naturally smaller. If an outpatient clinic should cost $25,000 a year and should help 25, just 25 alcoholics recover, that is, so that they are out of the jails, so that they are out of relief agencies, out of social agencies, so that they are working and supporting their families, out of accident wards, suffering less sickness, paying taxes, and if that recovery lasts from five to 30 years, there is an easy saving of $25,000 to that community on those 25 cases alone.

Let us further suppose that two of those 25 men were earning at one time $15,000 a year or more, that three of them earned at some point from $10,000 to 15,000, six from $5,000 to $10,000, nine of them about $3,000, another half dozen, say, around $1500 to $2000. What is the saving in each case? Are you going to measure it over a period of 25 years? Are you going to measure it over a period of just that one year? You spent about $90 on each. Furthermore, it is not only that those people were at one point making that money and then dropped down and weren't making it; they were costing

the public something; they were costing their relatives a few hundred dollars a year. Maybe their families were living on charity. There are many positive expenses in addition to the complete loss or 80 or 90% loss of earning power.

Some of these people may still be hanging precariously to jobs below their potentiality. I think of one case right away of a man we worked with: He had a $12,000 a year job. He was just about to be fired. He had had three chances. This time he was through and would have been fired. Actually for about a few hours he was fired until we got in contact with him and with his company. He probably would have gotten another job after his bender was over. In the meantime his family would have taken quite a beating. Both his son and his daughter were in college and would have dropped out. He would have gotten another job probably at less pay and it would probably have been of a lot shorter duration too. Our clinic caught that man and he kept that job. In fact, he was back on the job within 10 days. It was a year and about three months ago that he was getting $12,000. He has had two increases since then, and is now the head of that division for—I will just say a certain area in part of New England. It cost $90 to do that.

It did not cost his company a cent, because that is a public clinic. What was it worth to his company, a man they had had for about 14 years, with such experience that he could be the head of one of their national regional divisions? I don't know. Was it worth $90 to them? Was it worth $900? Was it worth $9,000? I cannot say. I have been speaking in terms of 25 people a year, but an outpatient clinic takes all sorts of cases, the less likely, the feeble-minded, the psychotic, the criminal, the worst primary types, etc. An outpatient clinic should handle from 250 to 300 cases a year and should show even with these limited facilities, a minimum of 33 1/3% success, way beyond, of course, the 25 cases that were suggested. What could one do with an industrial clinic, with selected cases, with facilities far beyond those of the public outpatient clinic? Well, I don't know. I would presume that any such clinic which had less than 50% success had something grievously wrong with it.

I won't have much time to say what a clinic is or how it operates. I will merely say this: It has, above all, three functions—immediate relief of the situation, diagnosis, therapy. Diagnosis does not consist of saying, "Oh, he is drunk." That is about all that happens today. "He is drunk"—Jail! The personnel of a minimum clinic will consist of a psychiatrist, a part-time internist, perhaps two psychiatric social case workers. One sometimes uses a clinical psychologist. One sometimes has great success in using trained, recovered alcoholics.

Depending on diagnosis, treatment consists of therapy which is on three main levels. First, the physical or physiological, both to take care of the immediate symptoms. The man probably comes in immediately after a bender from which he may have heaven knows what butterflies. Well, maybe you don't know the language but he has a great many problems at that moment. He may also have some rather long-term problems dealing with nutrition, or perhaps as far as that is concerned, dealing with his teeth or his eyes or some other part, and this is a very good technic to lay the groundwork for the psychological-psychiatric treatment which is to follow.

On the psychological side this man needs psychological restraining. He immediately needs relief from the horrible remorse, guilt, the feeling which almost, and sometimes, does lead to suicide, but in the long run he needs a psychological restraining to handle that egocentricity, to handle that immaturity, to enable him to act on a normal, mature basis as far as it is possible with his fellows. And finally, on the social level, again immediate treatment is needed, but more importantly in the long run, he must learn how to be with other people, to act as a socially mature person, to have friends, to enjoy doing things, to accept attitudes which his fellows will take.

In many cases, as the experience of Alcoholics Anonymous shows so clearly, a superficial therapy on the psychological level and a continuing technic of social or sociological rehabilitation will alone return the individual to a sober way of life, satisfactory to himself and to the community.

It should be added that many of these recovered alcoholics appear to be not merely recovered but to be people who are far greater than the maximum evaluation of their personalities before they ever became alcoholics. It has even been observed and commented on in industries which have tried to do something about alcoholism by taking this one step only. They would allow or even foster something within their industries. I happen to be thinking of DuPont and Kaiser.

Beyond the immediate matter of therapy, and essential to its success, are two other steps which can only be mentioned: one is continuing and expanding research both in etiology and in therapy, the other is community education and organization. Rehabilitation cannot occur in a vacuum, nor can it occur in an environment which is either utterly ignorant or even hostile. In this connection, I should point to the Yale plan on alcoholism, with its clinic, its medical and social research organizations, its school on alcohol problems, its publication division which publishes both scientific and lay materials on alcohol and alcoholism, and to its community organization and education division, the National Committee for Education on Alcoholism, which today has branches in 37 cities, in 26 states and two countries.

In conclusion, I point out that alcoholism is a very great public health problem. It is a great problem also of industrial health, a problem which at times, as in 1940 to 1945, can become acute. That the problem has been hidden, denied,

or ridiculed in the past is not extraordinary even though it may be deplored. Today, however, there are proven means, money-saving means, practical means of dealing with the problem, means which develop prevention along with recovery. Because of the nature of the condition, the problem is not only peculiarly expensive to industry, but, strangely enough, it is more susceptible to correction in industry than in the community at large. The problem, however, is not susceptible to correction overnight. A problem that has harried our society for centuries will not disappear through wishing or through words. It will take honest recognition of the problem; it will take sincerety; it will take training and research; and it will take cooperation with the community and with those agencies of the community that are assets. Great advances can be made, and I believe they can be made in our time.

Discussion

DR. BACON offered to answer questions or to discuss any phase of this that he has not covered. These and DR. BACON'S replies were as follows:

QUESTION: I should like to ask the distribution of alcoholics by urban and rural, and educational levels.

DR. BACON: I can give some answer to the first Although I do not have the figures right in front of me, they are available. The incidence of alcoholics is far greater in the urban areas. This does not mean, necessarily, that that is where they come from or the urbanism is the cause, but they are attracted to the cities. There is alcoholism all over. That is, you will find in bone-dry areas of this country, flourishing groups of Alcoholics Anonymous. There is only one implication.

As to the educational level, so far as we know, there is just what you would expect according to population. There was a suspicion for some time, and I won't say that we know it is not so, that there would be a heavy incidence at the very highest levels and at the lowest levels, but that there would be, because of what may be called middle class adherence to the mores and moral values and the great inhibitions working there, a lesser amount of alcoholism in that group, but it has not been so proven. It would seem to be very evenly scattered. We do find a difference, however, in certain nationalities, that is, in those who haven't been in this country too long. After they have been here for a while they tend to mount or to descend to the American level—it is usually mount. Take the Jewish group, for instance, the level of alcoholism among the Jews is very low. Take most of the Mediterranean groups, the Italians primarily, and the level goes quite low, but not as low as among the Jewish group. Take the Polish and the Irish, there the level is very high. In the so-called native white, old Anglo-saxon stock, and the level is very high. But then take the Italian, let's say, of third generation in this country, some of them are too young, but I have no doubt that they are going to be in the same grouping as the average by the time they get into the 35 and 45 year old range because their drinking habits are very, very different from those of their fathers and grandfathers. They are not the old homemade wine drinking group any more. No, they are out drinking rum cokes, going to taverns, getting the habit of drinking hard liquor before or long after meals instead of drinking with meals. You know, low content drinking — being taught drinking from the age of three months, not taking up the drinking of hard liquor at 19. By and large, alcoholism just hits right across the entire population.

QUESTION: Is the group of secondary drinkers ever able to acquire the so-called social drinking state again?

DR. BACON: Unfortunately, I can give an absolutely categorical answer. No, none of them if they wish to stay recovered can ever become alcoholics again. You may have noted that I did not use the word "cured" at any point. I said "recovered" or "rehabilitated." When they start drinking again they recapture quite quickly and, so far as I know, without exception the drinking attitudes, the drinking behaviors of alcoholics. Those of you who know some technical language in psychology may remember the phrase "spontaneous recovery," which refers to the relearning of old habits or emotional states.

It comes just like that. Some will have one beer, because, of course, beer isn't alcohol. Oh, they may go along even a month but for many of them that one beer is just leading right into the next 35 drinks, but some can't believe it and they have to learn it the hard way. Their therapeutic slips teach them.

QUESTION: What is the initial step that a company should take to combat the problem?

DR. BACON: I think the first step can be stated in general terms. No two companies are going to have the same problem and I don't know about industrial companies. The first thing to do, however, I think is to find out about the problem. Find out what the problem is. Perhaps the second step, or one that goes with that first step, is to find out what is the stage of knowledge and experience today. I would suggest to you, that perhaps your finest source for that would be some part or the whole Yale plan on alcoholism, which collects all the information there is and makes a practice of sending it out to anybody upon request. How does the clinic work? Find out. How much does it cost? Find out. Can I send somebody from my plant, a personnel man, a person in medicine, a nurse, to the school or clinic? Let them go down and find out and see if it is any good for you.

Let's look at the problem. Admit that it is there, and it is, I assure you. Then find out for yourselves. I think the first step is to look it over and look over what the possibilities are and what can be done.

Pulmonary Dust Disease

A. R. RIDDELL, B.A., M.B., D.P.H.

OPINIONS concerning dusts and pulmonary disease have changed somewhat during the last few years. For a considerable period following 1918 attention was chiefly centered on silica. Dusts were classified as active or inert according as the reaction they occasioned in the lungs resembled or differed from that produced by silica. Although silica is still recognized as the most important dust concerned with dust lung injury, it has gradually become apparent that dusts other than silica and the silicate asbestos may be involved in pulmonary disorders.

A description of silicosis is superfluous at present. The disease has received so much attention and has been discussed so often that you are all conversant with its general features. You realize that silica dust inhalation, if the quantity of dust inhaled is adequate, may result in lung fibrosis of a special nature. Collagenous nodule formation is characteristic of this process, but its regular deposition may be altered often profoundly by accompanying infectious processes, or by admixture of the dusts of other materials with silica. It is general knowledge that silicosis is prone to association with tuberculosis, but the implication may not be so fully appreciated.

The late DR. GARDNER[1] is reported to have advanced the opinion that, when chronic, a combination of silicosis with tuberculosis constituted a disease quite different from either of the other two contributing conditions. Certainly it is difficult to treat. As a rule it gradually progresses in spite of what is attempted, and surgical measures are unsatisfactory. This disease may be seriously disabling, although those affected are not always obviously ill.

The importance of tuberculosis in conjunction with silicosis is illustrated by information supplied by consideration of the causes of death in a series of 436 silicotics on whom we have records. The persons concerned had been employed in various occupations carrying a silica hazard. A little more than half of them were miners. Pulmonary tuberculosis caused the deaths of 62% of the persons comprising the whole series, and was responsible for 68% in the mining group.

Estimations of disability are notoriously troublesome in silicotics. It would seem that these are too often based on radiographic appearances together with attempted measurements of breathing capacity, and that other useful information is apt to be neglected. In assessing disability the clinical picture should be viewed as a whole. Careful consideration of the information afforded by the symptomatology and clinical findings in the individual cases, may be of considerable value in the estimate of disability.

A review of the symptoms and signs presented by 637 persons with silicosis was recently made. This offered information which may be usefully applied. The investigation confirmed the finding that dyspnea is the commonest symptom and limited expansion the commonest sign. It also disclosed, that of 203 persons with a history of having had night sweats, 117, or approximately 58%, had positive sputum. Bacilli were demonstrated either at the original examination, or later on follow up. It indicated, that 70, or 80%, of those with hemoptysis were tuberculous, and that 184, or 75%, of those whose fingers were clubbed or who had curving of the finger nails, had positive sputum, or were dead when the analysis was made.

It will be realized that for practical purposes, diagnosis in silicosis involves the differentiation of type as well as recognition of the disease. Commonly this is made on the radiographic appearance a case presents. Cases with clear cut uniform nodulation are interpreted as simple, and those with conglomerate or massive shadowing as complicated. Although this may be a useful working rule in relation to the interpretation of radiograms, there are many exceptions to it. Not infrequently the radiographically simple case will prove to be complicated, and no evidence of an infectious process can be demonstrated in the radiographically complicated, even at autopsy.

Compensation complicates the silicosis problem. With diagnosis so dependent on the interpretation of radiographic shadowing as is the case at present, it is well to remember that heavy or prominent shadowing in the lung fields or even nodulation, does not necessarily denote fibrosis or silicosis. These appearances, commonly ascribed to the effects of silica, may be simulated by lung changes related to other conditions than silicosis, in which there is often no fibrosis. When cases presenting such radiographic appearance lack a history of dust exposure the situation may not be too difficult, but with such a history they may cause considerable confusion. We have found the more important of these confusing conditions to be—heart diseases, particularly mitral stenosis, certain fungus infections, benign pneumoconioses, disseminated new growths of the lung, and sometimes pulmonary tuberculosis with a miliary distribution.

Aluminum dust employed in the treatment of, or as a prophylactic in silicosis, has received much attention in this regard during the last few years. It is administered in two forms, as finely divided metallic aluminum, and as aluminum hydroxide. The metallic powder is the more important agent, and at present many persons are receiving it both here and abroad. Its adminis-

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tration has not been observed to be attended by injury, neither however, is there convincing evidence that it has been of objective benefit to silicotics. Nevertheless, many persons receiving, or who have received aluminum for silicosis claim subjective improvement.

The status of aluminum as a therapeutic agent has not yet been determined. It seems to offer possibilities as a prophylactic, but as considerable time is still necessary to establish its usefulness, no laxity in regard to recognized methods of dust control should be countenanced.

Early in 1942 an occupational lung disease new to this continent was discovered by DR. C. G. SHAVER, Superintendent of a sanatorium situated near St. Catherines, Ontario. A description of the disease and the circumstances which revealed it has already been published.[2] The details need not be repeated. In the process involving bauxite, aluminum ore is converted to corundum, a hard metal used in the abrasive industry. While the process is in operation, the attendant workmen are exposed to dense fumes from the materials being treated.

The process is not new. It has been carried on for upward of 20 years in some of the plants concerned, yet it was not previously known to be injurious. This may be explained on the basis, either that in the past it did not occasion lung injury, or the disease was not recognized because its accompanying signs and symptoms were ascribed to other causes. The latter is the more probable. Early cases are symptom free, the signs, exclusively radiographic, are often so slight that they would be readily missed by one not conversant with the situation and on the look out for them. Later cases as characterized by attacks of sudden extreme dyspnea and chest pain which have, on occasion, been interpreted as indicating heart disease or pneumonia.

The radiographic characteristics of the condition may be divided into "early" manifestations and "well established" disease. The early manifestations are extremely slight. They consist of an indefinite granular appearance in the apices with slight rather lace-like shadowing which appears in the sub-apical area and which may extend to the first interspace. As the condition advances the lace-like shadowing is found extending lower in the lung fields. A further extension is accompanied by the loss of the lace-like character of the shadowing. Eventually the whole lung field may be occupied by shadowing which has a rather granular, or even an irregular nodular appearance.

Coincident with the peculiar lung shadowing the diaphragm is generally markedly distorted, and the mediastinum is widened. The "well established" case is characterized by the occurrence of spontaneous pneumothoraces, very often bi-lateral. These occurrences are associated with the rather dramatic appearance of desperate dyspnea and severe chest pain.

The fume is the source of this lung damage. It contains considerable quantities of very finely divided alumina and silica, and small amounts of many other substances. Which of these is responsible has not yet been determined. In the presence of so much silica, this material cannot be absolved, on the other hand rather similar lung damage has been reported from Germany[3] in exposures in which aluminum at least figured. MIDDLETON[4] also reported a case in England in which exposure to aluminum was associated with lung changes.

The inhalation of cadmium or cadmium compounds, either as fume or dust is attended by respiratory damage of a serious nature. In an Ontario exposure 15 workmen from two plants were injured in this way in 1935—two died.

Dust is produced when the metal is being ground or polished. Fumes are evolved during welding operations, or when the metal is subjected to high temperatures by accident, or for the purpose of removing cadmium plate.

When small quantities of cadmium are inhaled, dryness of the throat, cough, a sense of restriction in the chest, headache and vomiting are produced. Heavy exposure is followed by severe lung changes, accompanied by marked dyspnea, persistent cough, cyanosis and prostration, which may be prolonged. The disease has the characteristics of a chemical pneumonia, and this is confirmed by postmortem findings. Convalescence is apt to be protracted, but they eventually return to work without disability.

In one instance radiographs were prepared during the acute illness. In this, the lung fields were seen to be occupied by intense nodular shadowing, closely resembling that to be observed in certain cases of silicosis. Radiographic examination of the survivors of the affected was carried out some years later. In none was there evidence of any permanent lung injury.

It was during the war years that beryllium poisoning was drawn to our attention.[5] Exposure to beryllium or to certain of its compounds is attended in certain individuals by skin troubles. It is also attended by lung disease, often of a serious nature. The disease has special features: Symptoms may develop during exposure, or they may be delayed, perhaps, for months or years after exposure has ceased. Two types of the disease are recognized, an acute type and a delayed. The acute form has characteristics which suggest a chemical pneumonitis. It results from exposure to high concentrations of beryllium compounds. It may be severe and even fatal, but in those who survive, the condition has a tendency to clear. The delayed form appears to have little relation to intensity of exposure. It is more apt to occur where relatively light, but more prolonged exposure has been sustained. A feature of the delayed form is the occurrences of scattered granulomatous areas in the lung tissue which may undergo organization. In some cases the radiographic appearances closely resemble silicosis, it was therefore thought at one time that the disease might be a modified silicosis. The etiology is still obscure. While investigating this matter, it was DR. GARDNER'S[6] opinion that some other factor than beryllium

might be involved. This apparently has not yet been established. Considerable data is being collected and may serve to resolve the question.

The dust of asbestos, a fibrous silicate, induces a lung fibrosis which may be disabling. The disease asbestosis differs considerably from silicosis. Although areas of fibrous tissue develop throughout the lungs, these do not exhibit the nodular pattern that distinguishes that condition. Radiologically it is also different. Characteristically the heart shadow is shaggy, and the lung fields have a granular or "ground glass" appearance, but definite nodulation is not apparent. Circulatory embarrassment is common in asbestosis. The disease however, does not appear to predispose to tuberculous infections.

Aside from asbestos, silicates are not usually related to lung injury. In this respect talc, a hydrated magnesium silicate, may be an exception. Although no clear evidence of injury has been produced in connection with persons handling talc, in many industrial operations such as tire building, paper making, etc., injury has been demonstrated in relation to the production of this substance. Some years ago in Ontario the miners and millworkers from a small talc producing plant were surveyed. None of the miners showed radiographic changes suggesting disease, but examination of 37 mill men engaged in crushing ore discovered 13 in whom chest films gave evidence of lung fibrosis. The exposure periods in these cases were from five to 18 years. The average exposure was 12 years.

The radiographic appearances were not uniform. In some, diffuse fine granular shadowing was seen throughout the lung fields. In others, nodular shadowing resembling but rather softer in character than that of silicosis was present. Several presented a combination of these appearances, with or without areas of massive shadowing. Repeat examinations of many of those affected reveals that in none has there been any clearing, but that several have progressed.

The talc, a fibrous and flaky variety containing a small quantity of tremolite, occurs in formation consisting largely of crystalline limestone. In this formation numerous stringers of quartz are found. In the past, dust conditions in the mills were very bad, and great clouds of dust, visible from a considerable distance, could be seen escaping when crushing was in progress.

Dust sampling was done in these mills. The samples varied considerably in silica content, depending on where they were collected. Air samples contained approximately 34% silica, and settled dust from the beams about 55%. The free silica content was estimated at 1% to 2%.

It is evident that in 1943 SIEGAL[7] and others encountered a situation somewhat similar to this in St. Lawrence County, New York.

Doubts are entertained respecting the Ontario exposure. Having regard to dust conditions and the quartz in the limestone carrying the talc, the abnormal findings may very well reflect a silicosis modified by other dust. On the other hand, the matter of the extremely heavy dosage must be considered. Although several of our cases have died, we have not so far secured autopsy material. This is essential to a solution of the problem.

Certain lung conditions termed benign pneumoconioses, of which siderosis is an example are not infrequently encountered. These conditions are not in the least disabling and they do not affect life expectancy. They arise in relation to occupations in which dust of metals or other inert materials are produced. Particles of these materials opaque to the roentgen rays, on reaching the lung tissues are deposited in relation to the lymphatics, where they remain inactive causing no injury.

These conditions are not properly termed disease. I have referred to them merely because they may occasion radiographic appearances scarcely to be distinguished from those due to silicosis. It should be remembered however, that infectious processes may occur in persons with benign pneumoconiosis. In such cases the infection is the disease to consider.

YOUR attention has been directed to a few dusts which are involved in the production of pulmonary diseases, and certain characteristics of the disease they occasion, have been referred to. The subject has not been exhausted however: The connection between bagasse, sugar cane from which the sap has been extracted, and lung disease, should not be overlooked. Neither, should it be forgotten that dusts such as arsenic and those of certain radioactive materials have been related to the occurrence of neo-plastic lung conditions. You will recall that cotton workers are subject to an occupational disease, in which the materials they handle are in some way concerned, and that cotton dust may be involved.

We have in Ontario, plants in which the workers are in exposure to radioactive materials, arsenic and cotton. Most of the plants have medical departments, and x-ray surveys of the working staffs have been conducted from time to time. In spite of this careful supervision however, no convincing evidence has yet been forthcoming which would indicate that any of these materials are implicated in the causation of this type of lung injury in Ontario.

Complacence, especially in regard to occupational dusts of any nature, is always dangerous. Also new substances are frequently being introduced into industrial operations, and older substances used in new ways and combinations. The result of these changes is often unpredictable. Constant vigilance is therefore necessary.

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Results of Influenza Vaccination in Industry during the 1947 Epidemic

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THE possibility of controlling influenza epidemics in industrial groups by inoculation of employees with the influenza A and B vaccine was discussed in a review presented in November, 1946.[1] Since the vaccine had just become available to the general public at this time, evaluation of this procedure in industry had not been possible. During the winter of 1946-47 some industries offered such vaccination to their employees in anticipation of an epidemic. Since an epidemic of influenza A occurred in the late winter and early spring of 1947, this department decided to survey these industries to determine whether this procedure had been of benefit in lowering the respiratory disease and absenteeism rates in these plants. The results of this survey are summarized in this report and are considered in relation to the general characteristics of the 1947 influenza epidemic and other data concerning this epidemic which have become available in the past few months.

General Characteristics, 1947 Influenza Epidemic

THE 1947 influenza epidemic was recognized initially in Eastern Asia in December, 1946. It appeared first in this country in two western Army installations but it was not reported in the civilian population until the week of February 22.[2,3] The peak of the epidemic apparently was reached during the week ending February 22 in the Army installations, March 15 in the Naval establishments, and March 22 in the civilian population.[2] This 1947 influenza epidemic appeared to be less widespread and more localized in scattered sections of the the country than the preceding epidemics. The resulting illness was in general very mild and the incidence of clearly recognized cases was low.

The virus responsible for this epidemic was identified serologically as influenza A, but the strains which were isolated appeared to be antigenically different from the strains which were included in the vaccine.[4,5] Furthermore, the vaccine which was used during the winter of 1946-47 appeared to induce a poor antibody response against the new strains. The National Institute of Health has issued instructions that one of the new strains (FM_1) of the influenza virus, isolated during the 1947 epidemic, be included in the vaccine.[4]

Results of Industrial Studies

IN MAKING the industrial survey, letters were sent in June to the medical departments of 86 corporations, many of which had branches scattered throughout the country, asking whether they had offered influenza vaccination to their employees and, if so, requesting information concerning the results of this program. Of this number, 31 companies replied that they had offered influenza vaccination to part or all of their employees but only 11 corporations (13 companies) were able to supply records which allowed a comparison of the respiratory disease rates between the vaccinated and non-vaccinated groups.

The results of the influenza vaccination programs in these 11 industries are presented in Tables 1 and 2. Table 1 gives the incidence of respiratory diseases or influenza in the vaccinated groups as compared with the non-vaccinated groups, and Table 2 shows the incidence of acute reactions to the vaccine.

In considering industrial sickness rates, such as those presented in Table 1, certain limitations must be kept in mind. Industries in general cannot verify sick-absenteeism cases of short duration. The cause of such absences and the diagnosis of the illness are supplied usually by the employee. Even in those cases seen by a physician, the diagnosis of influenza must be made solely on the basis of clinical symptoms, since serological tests for the influenza virus are not possible except for experimental purposes. Hence, many cases of respiratory infection are diagnosed incorrectly as influenza, especially during an epidemic. On the other hand, many cases of true influenza are not recognized as such. Furthermore, there are certain psychological factors which influence such data both on the part of the doctor and the employee. Another condition which must be kept in mind in considering these data is that vaccination is offered by industries on a voluntary basis. Under such circumstances people who are susceptible to acute respiratory diseases are more apt to request vaccination. Hence, this group would be expected to have a higher rate of respiratory diseases since the vaccine does not protect against the common types of acute respiratory diseases but only those specifically caused by the influenza A and B virus. Lastly, in order to compare the sick-absenteeism rates of any two groups of employees such as vaccinated and non-vaccinated groups, the age and sex distribution should be similar, which is seldom possible in industrial groups. These various difficulties can be controlled by comparing the same two groups during non-epidemic periods as well as during the period of the epidemic and by considering the industrial data in relation to the general characteristics of the 1947 epidemic and the results of other studies made during this period. The data presented in Table 1 are discussed with these factors in mind.

The industrial data were supplied by 13 companies scattered throughout the United States and covered a total of approximately 37,006 vaccinated and 39,669 non-vaccinated individuals. As shown in Table 1, the type of illness records which were submitted by the individual plants differed greatly, as well as the period of time covered. Hence, the data cannot be summarized but must be discussed for each individual company.

In seven companies—A, B, C, D, E_1 E_2 and T —the incidence of respiratory diseases diagnosed as influenza was not significantly different or was slightly greater in those employees who were vaccinated as compared with the non-vaccinated groups, thus indicating no beneficial effect of the vaccine. At least one of these companies was located in an area where the epidemic was reported to be severe. In the case of Company E_1, which supplied the rates separately for men and women, the difference in the influenza rates between the vaccinated and non-vaccinated groups were not statistically significant for either sex.

On the other hand, lower rates were reported in the vaccinated groups than in the non-vaccinated groups by six companies—F, G, H, I, J, and E_3. Examination of these data indicates that the lower rates of respiratory diseases in most of these groups probably was not due to the vaccine. Company E_3, although having significantly lower rates for the entire group, showed inconsistent results when the figures were broken down by departments. The rates from Company G allow a comparison of the vaccinated and non-

TABLE 1.
COMPARISON OF RESPIRATORY DISEASE RATES IN VACCINATED AND NON-VACCINATED EMPLOYEES

Company	Geographical location of company	Number of employees		Type of illness recorded	Period covered	Incidence of Respiratory Disease or Influenza				
						Number cases		Rate per 100		% increase or decrease in rate in inoculated group as compared with non-inoculated group
		non-inoculated group	inoculated group			non-inoc. group	inoc. group	non-inoc. group	inoc. group	
A	Total of 6 plants Del. Va. Mass. N. Y. La.	910	896	Influenza causing absenteeism of 1 or more days	6 mos. 1946-47	85	91	9.3	10.1	+ 8.6
B	La. Okla.	865	641	Influenza causing absenteeism of 3 or more days	Nov. 1-May 20	61	54	7.1	8.4	+18.3
C	Wis.	820	968	Influenza & la grippe All cases	Jan.-Apr. (incl)	85	149	10.4	15.4	+48.1
				Lost time cases		69	112	8.4	11.6	+38.1
D		Slightly less than 147	147	Influenza	3 weeks during epidemic	14	15		10.2	Prob. no difference
E1	N. Y. Males	1983	2724	Influenza		161	186	8.1	6.8	—16.0
				Other respir. dis.		547	758	27.6	27.8	+ 0.7
				Total respir. dis.		708	944	35.7	34.6	— 3.1
	Females	4606	4208	Influenza		398	318	8.6	7.6	—11.6
				Other respir. dis.		3461	2342	75.1	55.6	—26.0
				Total respir. dis.		3859	2660	83.8	63.2	—24.6
E2	N. J.	8900	11,600	Influenza	Dec.-March (incl)	463	569	5.2	4.9	— 5.8
				Other respir. dis.		3672	4443	41.3	38.3	— 7.3
				Total respir. dis.		4135	5012	46.5	43.2	— 7.1
E3	Mont. Wyo. Idaho Utah Col. Ariz. N. Mex.	7262	8968	Influenza causing absenteeism of 3 or more days	Dec.-March (incl)	444	414	6.1	4.6	—24.6
	By department									
	1	470	611			45	62	9.6	10.1	+ 5.2
	2	409	865			32	42	7.8	4.9	—37.2
	3	45	107			1	5	2.2	4.7	+113.6
	4	1564	2597			50	83	3.2	3.2	0
	5	4748	4726			316	222	6.7	4.7	—29.8
	6	26	62			0	0	0.0	0.0	0

TABLE 1. (Cont.)
COMPARISON OF RESPIRATORY DISEASE RATES IN VACCINATED AND NON-VACCINATED EMPLOYEES

Company	Geographical location of company	Number of employees		Type of illness recorded	Period covered	Incidence of Respiratory Disease or Influenza				
						Number cases		Rate per 100		% increase or decrease in rate in inoculated group as compared with non-inoculated group
		non-inoculated group	inoculated group			non-inoc. group	inoc. group	non-inoc. group	inoc. group	
F		1202	891	Influenza causing absenteeism of 3 or more days	Nov. 1-May 20 (incl)	137	55	11.4	6.2	—45.6
	By geographical area									
	Wyo. Utah Col. Mont.	467	8	"	"	44	1	9.4	12.5	+33.0
	Ark. La. Miss. Ala.	99	116	"	"	17	6	17.2	5.2	—69.8
	Ill. Mich. Ind. Ky.	97	268	"	"	22	19	22.7	7.1	—68.7
	Kan. Okla.	242	206	Influenza causing absenteeism of 3 or more days	Nov. 1-May 20 (incl)	16	19	6.6	9.2	+39.4
	Okla.	297	293			38	10	12.8	3.4	—73.4
G	N. Y.	Varied from month to month		Respir. dis. with & without lost time	Nov.-Apr. (incl)	8252	557	88.8	54.6	—38.5
		Approx. 8929	Approx. 1071							
					By month:					
					Nov.	1104	67	9.7	6.8	—29.9
					Dec.	1474	95	11.9	9.3	—21.8
					Jan.	1504	128	18.0	12.6	—30.0
					Feb.	1180	79	14.8	7.8	—47.3
					Mar.	1719	107	19.7	10.2	—48.2
					Apr.	1271	81	14.7	7.9	—46.2
H	Calif.	475	727	Influenza	Oct.-May (incl)	21	11	4.4	1.5	—65.9
I	N. Y.	700	2000	Influenza		30	38	4.3	1.9	—55.8
J	Md.	576	576	Respir. dis. & nonspecified illnesses causing absenteeism of any length	Jan. 6-May 3	406	338	70.5	58.7	—16.7
		(Comparable groups as to sex, dept., & shift)								
					By month:					
					Jan. 6-31	96	94	16.7	16.3	— 2.4
					Feb. 3-28	81	81	14.0	14.0	0
					Mar. 2-29	118	93	20.5	16.1	—21.5
					Mar. 30-Apr. 26	96	62	16.7	10.8	—35.3
T	Ill.	2299	1589	Influenza causing absenteeism of any duration	Oct. 1946-Mar. 1947 (incl)	99	68	4.3	4.3	0.0
				Colds causing absenteeism of any duration		732	499	31.8	31.4	— 1.2
				Colds + Influenza causing absenteeism of any duration		831	567	36.1	35.7	— 1.1

vaccinated groups during the four months (November-February) preceding the epidemic as well as during the epidemic period (March-April). Since the respiratory disease rates were lower in the vaccinated group during all months from November through April and since the vaccine is only effective against influenza, which was prevalent only in March and April, the lower rates in the vaccinated group appear to have been due primarily to other factors than the vaccine.

Furthermore, this company, as well as companies H and I, are located in an area where the epidemic was reported to be slight, which, in itself, indicates that the lower rates in the vaccinated groups of these companies may not be the result of the vaccination. Although, on the whole, Company F reported a lower rate of influenza in the vaccinated group than in the non-vaccinated group, the results were not consistently lower when expressed separately for the different geographical regions covered by this industry. Company J analysed their sick-absenteeism due to respiratory and non-specified illnesses weekly over the four-month period of January through April. In order to study the effect of the vaccine they selected two small groups which were comparable as to number, sex and shift worked. There was no difference in the illness rates between the two groups during January and February but a lower rate occurred in the vaccinated group during the epidemic period. The difference in the rates of the two groups during March is, however, not statistically significant and is barely significant in the rates for April.

On the whole, therefore, the lower rate of respiratory diseases in the vaccinated groups reported by these six companies, although suggestive, cannot be directly attributed to the use of the vaccine on the basis of the data available at present and particularly in view of the negative results reported by the other companies.

Table 2 shows the incidence of immediate reactions to the vaccine and the resulting lost time for 17 companies individually and for a group of companies reporting to one institution. The incidence of acute reactions varied greatly in the different industries. Whether this is attributable to the different types of vaccine used or to difference in methods of evaluating the reaction is not clear. Three companies compared the incidence of acute reactions in men and women. No sex difference was reported by Company S[7] but higher rates in women than in men were reported by Companies O and R.[6] It appears that, although the incidence of mild reactions were quite high in some companies, the percentage of employees who lost time from work was very low.

Discussion

THE industrial data presented in this survey did not demonstrate a consistent reduction in the sickness rates of industrial groups as a result of influenza vaccination during March and April, 1947, when influenza A was known to be present in the country. This may have been due, first, to the inadequacy of the sickness records which were available for this study; secondly, to the low incidence of clearly recognized cases of influenza in this epidemic (in fact, it is not known just how much of the respiratory disease during this period was actually due to the influenza A virus), or, thirdly, to differences in the strains

TABLE 2.
INCIDENCE OF ACUTE REACTIONS TO VACCINE

Company	Number employees vaccinated	Number & per cent of employees having reactions to vaccine						Lost Time Due to Vaccination				
		Mild		Moderate		Severe		Number & per cent of employees lost time due to vaccination			Total number days lost	Average days of absence per case
		No.	%	No.	%	No.	%	Duration of lost time included	Number employees	%		
H	727							1 day or more	1	0.1	1 day	
A	691	323	46.7			68	9.8					
J	584	2 or 3	0.4					1 day or more	1 or 2	0.3	1 or 2 days	
F	1532							1 day or more	1	0.1	1 day	
E Div. 1	9513							½ day or more	438	4.6		.94 days
D	147	Some		2	1.4							
K	403							"Some lost time"	35	8.7		
								1 day	2	0.5	2 days	
L	30					1	3.3		0			
M	84			2	2.4			1 day or more	2	2.4	1-3 days	1-3 days
N	455										15 days	
O	Males											
	1110	299	26.9	187	16.8	38	3.4		34	3.1		1.6 days
	Females											
	387	102	26.4	86	22.2	15	3.9		16	4.1		2.1 days
P	853	90	10.5			17	2.0					
Q	430					1	0.2					
R*(6)	610	Local						Several hours or more	11	1.8		
		101	16.6	16	2.6	0	0					
		Systemic										
		64	10.5	11	1.8	0	0					
S*(7)	2332	Local			193		8.2%	1 day or more	23	1.0	29 days	1.1 days
		Systemic			378		16.0%					
E Div. 2	310	Local			106		34.1	No significant lost time				
		General			88		28.4					
E Div. 3	390	Local			127		32.6	No significant lost time				
		General			186		47.7					
Group of Companies	4084							Few hours or more	112	2.7		

*Published data—see references (6) and (7)
Figures from these two reports are frequency of reactions, not number of cases as are other data.

of the virus responsible for this epidemic from those included in the vaccine.

The results of these industrial studies are in line with those reported for a University group and for the Army personnel. The effect of vaccination (with the influenza A and B vaccine) on the incidence of respiratory diseases during the 1947 epidemic were carefully studied at the University of Michigan.[5] The results are shown in Table 3. The authors conclude that "the incidence of disease was no different in vaccinated and unvaccinated individuals" probably owing to "the lack of sufficient antigenic crossing between the strains of virus in the vaccine and the prevalent strain responsible for the epidemic."[5] Studies were made also at some of the Army installations during the epidemic. Although the Army did not have a control group for comparison with their vaccinated personnel in regard to the incidence of respiratory illness during the epidemic, their report notes that the vaccination of all Army personnel by the middle of February did not prevent subsequent minor outbreaks of influenza. This may have been due to the lateness of the vaccination or to the different antigenic properties of the 1947 strains from those in the vaccine.[2] However, their report states, "the fact that practically no (Army) stations developed really sharp, intensive epidemics more than one week after completion of the vaccination may possibly have significance."[2]

The material presented in this paper leads to a consideration of the type of data which should be available in the future for evaluating the effectiveness of influenza vaccination in industrial workers. In order to eliminate the many uncontrollable differences which may exist between any two groups, it is recommended that the rates of the vaccinated and non-vaccinated groups be kept on a weekly basis and compared during non-epidemic periods as well as during the epidemic period. Since it is impossible to differentiate accurately influenza from other acute respiratory diseases in large groups of industrial workers, it would seem equally as good, if not better, to utilize the rates for all acute undifferentiated respiratory diseases taken together rather than the influenza rates. It is hoped that such data will be collected when influenza again occurs here.

Summary

THE effect of vaccination with the influenza A and B vaccine on the incidence of respiratory diseases in a group of industrial workers during the 1947 epidemic was reported by 13 companies located in various regions of the United States. The data from six companies showed a lower rate of respiratory diseases or influenza in the vaccinated group as compared with the non-vaccinated group, whereas the rates from seven companies were higher or not significantly different in the two groups. Although the lower rates of respiratory illness in the vaccinated groups of some companies suggested a beneficial effect of the vaccine, analysis of the records by months and subdivisions of these companies indicated that other factors were probably responsible for these differences. This view is supported by the opposite results reported by some companies in this survey, by a consideration of these data in relation to the general characteristics of the 1947 epidemic, and by the negative results of other studies made during this period.

Although the data presented in this paper, in general, did not show a consistent reduction in sickness during the 1947 influenza epidemic as a result of vaccination, this does not imply that influenza vaccination will be of no value to industry in future epidemics. The lack of effectiveness of the vaccine may have been due to certain characteristics of this particular epidemic since it proved very effective during the 1943-44 and the 1945 epidemics. As information concerning the various strains of the influenza A virus become better known and the technological problems associated with the preparation of the vaccine are clarified, the effectiveness of the vaccine in different epidemics should increase. Therefore, the industrial studies reported here should be considered only as preliminary in character.

TABLE 3.
THE INCIDENCE OF RESPIRATORY DISEASE IN VACCINATED AND UNVACCINATED GROUPS AT THE UNIVERSITY OF MICHIGAN[4]

	Unvaccinated	Vaccinated
Number in group	7,615	10,328
Number cases of respiratory disease between March 3-April 4, 1947	616	743
Incidence per cent	8.09%	7.19%

[The author of this report wishes to express appreciation to all of the companies which responded to this request for information and especially to those companies which supplied detailed data for use in this survey. The author is greatly indebted to DR. KENNETH MAXCY, Professor of Epidemiology of the Johns Hopkins School of Hygiene and Public Health, for his assistance in preparing this report, and to DR. PHILIP SARTWELL, DR. JOSEPH E. SMADEL, DR. A. F. RASMUSSEN and their collaborators for permission to quote from their papers preceding publication.]

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Brucellosis in Industry

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BRUCELLOSIS stands at the forefront among diseases which are transmissable from animals to man and which are also closely associated with occupation. Main avenues of spread are through direct contact with infected animals and the use of raw milk and cream from infected dairy cows. The incidence of human brucellosis is highest among persons such as packing house employees, male farm workers, and veterinarians, whose occupation brings them into direct contact with infected animals, and lowest among urban residents who use none but pasteurized dairy products and who give no history of handling farm animals.

Reported Occurrence in the United States

DATA pertaining to the reported incidence of human brucellosis in the United States have been secured through courtesy of state health officers of the 48 states and from the Public Health Reports of the U. S. Public Health Service. The following table (Table I) presents the average annual total cases of brucellosis of man and the average annual rates per 100,000 in the various sections of the United States for the 17-year period, 1930-1946, and for the 7-year period, 1940-1946.

TABLE I.
BRUCELLOSIS IN THE UNITED STATES 1930-1946
Reported Morbidity Data Secured through Courtesy of State Health Officers and from Public Health Reports of the U. S. Public Health Service

States Area	Average Annual Cases 1930-1946	Annual Rate per 100,000	Average Annual Cases 1940-1946	Annual Rate per 100,000
New England	197.2	2.34	274.5	3.25
Middle Atlantic	371.3	1.35	426.0	1.55
East No. Central	581.9	2.18	807.0	3.03
West No. Central	617.5	4.57	931.8	6.97
South Atlantic	233.3	1.36	288.5	1.68
East So. Central	135.2	1.25	204.7	1.89
West So. Central	493.2	3.78	598.4	4.58
Mountain	99.9	2.41	142.9	3.44
Pacific	294.0	3.02	403.9	4.15
U. S. A. TOTALS Excl. of Washington, D.C.	3,023.5	2.31	4,077.7	3.11

For the decade, 1930-1939, reported cases of brucellosis of man in the United States, exclusive of the District of Columbia, averaged 2,386 cases per year, an annual rate of 1.99 per 100,000. Average annual reports totalled 4,078 during the period, 1940-1946, for a rate of 3.11 per 100,000 population. This represents an increase of nearly 60% in reported morbidity in the past seven years compared with the previous 10-year period. According to Public Health Reports, reported cases in the United States numbered 6,146 in 1947, compared with a median of 4,210 cases for the 5-year period, 1942-1946.

TABLE II.
BRUCELLOSIS OF MAN IN THE UNITED STATES 1930-46
Ten States with Highest Reported Morbidity for the 17-Year Period 1930-1946 and the Seven-Year Period 1940-1946

State	1930-1946 Annual Rate per 100,000	State	1940-1946 Annual Rate per 100,000
Vermont	11.7	Vermont	18.5
Iowa	9.4	Iowa	15.6
Oklahoma	7.7	Kansas	9.6
Kansas	7.0	Minnesota	9.5
Texas	5.8	Oregon	6.9
Minnesota	5.7	Texas	6.9
Arizona	4.5	Wisconsin	6.5
Wisconsin	4.3	Connecticut	5.4
Connecticut	4.2	Utah	5.1
Oregon	4.1	Nevada	4.8

While nearly all of the individual states have shown an increase in reported cases of brucellosis in recent years, North Carolina, the state with the lowest morbidity rate and significantly the only state thus far accredited in the program for eradication of brucellosis in dairy cows, had a rate of 0.4 per 100,000 for the years 1930-1941 and of only 0.3 per 100,000 for the seven-year period, 1940-1946. Hogs apparently are but a minor source of infection in that state.

The 10 states with the highest morbidity and the rates per 100,000 for the periods 1930-1946 and 1940-1946 are shown in Table II.

TABLE III.
BRUCELLOSIS OF MAN IN IOWA 1940-1946
Age and Sex Distribution in the No-Contact Group

Age Group	Male	Female	Total Number Male & Female	Percent
1—4	5	4	9	1.50
5—9	15	14	29	4.83
10—14	7	8	15	2.50
15—19	19	19	38	6.30
20—29	61	55	116	19.30
30—39	80	72	152	25.30
40—49	55	44	99	16.50
50—59	40	33	73	12.10
60 plus	33	37	70	11.60
TOTALS	315	286	601	99.9

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In Table III, attention is directed to (1) the nearly equal ratio of females to males, and (2) to the fact that over 60% of the cases occurred among persons in the age groups 20-49 inclusive.

Brucellosis in Iowa

DATA relative to occupation, residence, age and sex of patients; symptomatology, month of onset and duration of illness; the history of contact with livestock, use of dairy products (whether raw or pasteurized) and probable sources of infection—these and other items of information have been generously furnished over a period of years by Iowa physicians and veterinarians.

In 1947, reported cases of human brucellosis in Iowa totalled 902, compared with an unusual average of 396 cases for the seven-year period, 1940-1946.

Age and Sex Distribution: Through courtesy and interest of Iowa physicians, records of 2,405 brucellosis patients for the period 1940-1946 contain information with reference to age and sex of the patients. In the series of 2,405 case reports, 601, or 25% of the patients, gave no history of direct contact with farm animals. It is assumed that infection in this group was due in the majority if not all instances, to the use of unpasteurized dairy products.

Age and Sex Distribution in the No-Contact Group: Table III shows the age, sex and percentage distribution according to age groups, of patients who had no occasion for contact with farm animals.

Age and Sex Distribution in the Contact Group: Referring again to the series of 2,405 brucellosis cases for the seven-year period, 1940-1946, patients totalling 1,804 (75.0%) gave the history of direct contact with animals (hogs, cows) during weeks preceding the onset of illness. Age, sex and percentage incidence by age groups appear in Table IV.

TABLE IV.
BRUCELLOSIS OF MAN IN IOWA 1940-1946
Age and Sex Distribution in the Contact Group

Age Group	Male	Female	Male & Female Total Number	Percent
1—4	1	3	4	0.2
5—9	22	12	34	1.9
10—14	33	7	40	2.2
15—19	96	6	102	5.7
20—29	396	44	440	24.4
30—39	488	68	556	30.8
40—49	322	42	364	20.2
50—59	160	28	188	10.4
60 plus	64	12	76	4.2
TOTALS	1,582	222	1,804	100.0

It will be noted in Table IV (in striking contrast to the sex ratio observed in Table III), that 1,582, or 87.7%, of the patients were males and only 122, or 12.3%, were females. In addition, fully 75% of the patients were in the age groups 20-49 inclusive.

Brucellosis in Relation to Industry and Occupation

THROUGH the courtesy and interest of attending physicians of Iowa, a series of 2,031 brucellosis reports has been assembled by the state Department of Health during the eight-year period, 1940-1947. The 2,031 patients concerned include only such individuals whose occupation brought them into direct contact with farm animals prior to illness. Information pertaining to occupation or industry concerned, with the number of persons and percent of total for each occupation, is contained in Table V.

TABLE V.
HUMAN BRUCELLOSIS IN IOWA 1940-1947
Distribution According to Industry or Occupation of 2,031 Cases with History of Direct Contact with Animals

Occupation	Number	Percent of Total
Male farm workers	1,480	72.9
Meat packing industry	442	21.8
Veterinarians and assistants	43	2.1
Handlers of livestock	27	1.3
Retail butchers	13	0.6
Livestock dealers	9	0.4
Miscellaneous occupations	6	0.3
Rendering plants	5	0.2
Locker plant employees	3	0.1
Sales barn	3	0.1
TOTALS	2,031	99.8

A striking fact, evident in the figures presented in Table V, is that in the group of occupations characterized by direct contact with domestic animals, 1,922, or nearly 95% of the entire series of 2,031 cases, are male farm workers and packing house employees. Comprising the remaining 5.3% are veterinarians and their assistants, handlers of livestock, retail butchers, livestock dealers, employees of locker and rendering plants, individuals connected with sales barns and a small miscellaneous group.

TABLE VI.
HUMAN BRUCELLOSIS IN IOWA 1940-1947
Specific Morbidity Rates in Certain Occupation Groups Exposed through Contact with Animals Contrasted with the Rate per 100,000 in the Non-Contact Group

Occupation	Number of Cases 1940-1947	Average Annual Cases		Total Exposed to risk	Specific Rate per 100,000
Veterinarians (excluding assistants)	36	4.5	(a)	800	562
Packing house employees	442	55.2	(b)	20,000	276
Male farm workers	1480	185.0	(c)	311,776	59
Non-contact group 1940-1946	601	45.2	(d)	2,226,492	4

(a) Approximate number in Iowa; (b) estimated number; (c) male farm workers, census 1940; (d) total population exclusive of male farm workers.

The data shown in Table V assume a different aspect when the specific rates per 100,000 are considered on the basis of the number in each classification exposed to risk of brucella infection (see accompanying Table VI)

As evident from the data in Table VI the specific morbidity rate is highest among veterinarians and their assistants. The risk of infection and morbidity among packing house workers is nearly five times as great as that in male farm workers and nearly 70 times greater than among members of the urban population who have no contact with livestock.

Brucellosis Among Farm Workers

ALTHOUGH nearly all farm residents are accustomed to drinking raw milk and cream, the fact that approximately 75% of the rural patients are male farm workers, emphasizes the role of direct contact which allows brucella germs to invade the human body through the skin. It is likely that friction which attends the seizure of struggling animals plays an important part by forcing the causative germ into the skin. Casual contact with animals is probably insignificant compared with the close contact which attends special procedures like butchering, handling of new-born pigs, castration and marketing of hogs.

Rendering Plants

THE STATE of Iowa has 59 licensed rendering plants. The work in these plants consists mainly in (1) the skinning of cows, hogs, horses and sheep that die of disease or from other cause; (2) the curing of hides; (3) removal of intestinal contents; (4) cooking of carcasses, the main products being tankage (which is fed to livestock) and grease (for the manufacture of soap). Truckers who haul dead animals from farms to the rendering plant and those employed within are from time to time subject to exposure to brucella infection through direct contact.

Cold Storage and Locker Plants

MANY of the locker and cold storage plants (of which Iowa alone has 881), in addition to handling meat products (which entails proper wrapping, sharp-freezing and provision of cold storage locker space), have facilities and from week to week slaughter varying numbers of hogs and cows. Through direct contact with fresh tissues of these animals, butchers face hazards of infection similar to those in the retail meat market and in the larger packing houses.

Meat Packing Plants

DURING the eight-year period, 1940-1947, cases of human brucellosis totalling 514 were reported to the Iowa State Department of Health from 21 large and small packing plants in all sections of Iowa. Proper notification of cases has been incomplete.

Reporting of relatively more cases from several packing plants does not warrant the conclusion that brucella infection is more heavily concentrated there than elsewhere. On the contrary, adequate reporting is indicative of the fact that attention and effort are being given to accurate diagnosis and to application of the newer methods of therapy which are of most benefit to the patient. The extent of brucella infection is readily determined in the meat packing industry where many daily are exposed to hundreds or even thousands of hogs, cattle and sheep, some of which are known to harbor brucella.

Several surveys have in past years been carried out in Iowa in cooperation with the managers of two large plants. On one occasion the incidence of active and latent infection among apparently healthy workers was 18.2% among 240 persons tested, on the basis of positive agglutination reaction in dilutions of 1:40 and above. Among 251 persons tested several years later in the same plant, 10.8% were positive in dilutions of 1:40 and over.

In 1929, the author collected 343 blood specimens from hogs at the time of exsanguination, securing a blood specimen from every tenth animal among more than 3,500 slaughtered on the same day. Three per cent of the serum specimens showed positive agglutination in titers of 1:80 and above.

TABLE VII.
BRUCELLOSIS IN THE MEAT PACKING INDUSTRY
1940-1946

Department and Type of Work	Number of Cases	Percent of Total
Killing floor		
Hog (159), Beef (20), Sheep (9), Shacklers (3)	192	52.6
Meat trimming	57	15.6
Skilled tradesmen	22	6.0
Machinist (11), Electrician (4), Carpenter (4), Plumber (3)		
Casings and offal	19	5.2
Veterinary and lay inspectors	16	4.4
Condemned meat—tankage	13	3.5
Hides	9	2.5
Live hogs in yards	9	2.5
Cooling room	7	1.9
Office work	4	1.1
All others	17	4.7
	365	100.0

The importance of swine brucellosis was demonstrated in a study by MCNUTT who in 1935 spent most of the summer running agglutination tests and culturing swine tissues in a large packing plant in Iowa. He examined 1,547 hogs by the rapid agglutination method and found 3% of the animals infected. MCNUTT isolated Br. suis from 14 (41%) of 34 animals that reacted to the agglutination test. Organisms were cultured from the spleen, liver, uterus and lymph nodes.

A series of 365 records of packing house workers covering the period 1940-1946 contains de-

sired information with reference to distribution according to department and type of work in the plant (Table VII).

It will be observed that, although morbidity from brucellosis occurs among employees of many (if not all) departments and occupations, relatively more cases develop in the "kill and cut" departments where workers are in daily contact with fresh tissues of hundreds or even thousands of animals at the time of slaughter. Brucella organisms are apt to be widely disseminated, not alone on floors, but on walls at hand level, on bannisters, in elevators and elsewhere. Might not this factor account for infection and illness which now and then overtake the white collar worker in the same environment?

That the majority of packing house employees are users of pasteurized milk was shown in a plant survey conducted in Iowa a number of years ago. Furthermore, in a series of 148 records of packing house employees, assembled over the seven-year period, 1936-1942, and containing needed information, 123, or 83%, were stated as having used pasteurized milk during the weeks preceding onset of symptoms.

Occurrence of Brucella Strains in Iowa

DURING the period from September, 1927, to March, 1947, brucella strains totalling 434 were isolated from the blood and tissues of Iowa patients, under supervision of I. H. BORTS, M.D., Director of the State Hygienic Laboratory. Of the total number, 139 or 30% were Brucella abortus, 254 (58%) Br. suis and 47 (11%) were Br. melitensis. One strain remained unclassified.

In a series of 44 Iowa patients with Brucellosis melitensis, 23 were employed in the meat packing industry; the remaining 21 resided on farms, including a painter who worked on several farms preceding illness. None of the patients gave the history of direct contact with goats. One had had contact with sheep and three had worked with sheep along with hogs and cows. Of a total of 46 of these patients, 37 or 80%, had been in direct contact with swine on farms or in the meat packing industry. With one exception, (a farmwife who had handled new-born pigs), all of the patients were males. Twenty-four widely scattered counties in the state have thus far shown endemic occurrence of Br. melitensis, all, so far as known, with source in hogs.

Laboratory Aids in Diagnosis

The Blood Culture: It is highly desirable that blood cultures be taken from employees in industry who show fever, chills, sweats and other symptoms suggestive of acute or sub-acute brucellosis. It is desirable also that blood cultures receive careful study in public health laboratories equipped to carry out the necessary procedures and techniques. Isolation of brucella not only confirms the clinical diagnosis but makes possible the species identification of the organism and aids in tracing infection to its source, in the hog, cow, sheep or goat.

2. *The Agglutination Test:* This test is second in importance to the blood culture. Both rapid and macroscopic tube methods are trustworthy. When negative at first, the agglutination test should be repeated. Although the titer tends to go down and finally to disappear, positive agglutination often continues for three to four years or longer.

3. *Special Cultures and Guinea Pig Inoculation:* Brucella may be isolated and identified after special culture or guinea pig inoculation with blood, exudates, urine, bile, feces, tissues, organs, or food products such as milk, cream or cheese.

4. *The Skin Test:* A positive skin test with brucella antigen, like a positive Mantoux or tuberculin reaction, usually indicates that exposure to infection has occurred at some time in the past. Skin test surveys in Iowa have revealed positive dermal reaction in from 10 to 25% of apparently well persons. Attaching clinical significance to a positive skin reaction in the absence of positive agglutination, often leads to error in diagnosis.

Using several types of brucella antigen, SPINK and associates of the University of Minnesota performed skin tests consecutively on 533 patients admitted to the university hospital for treatment of various conditions. Although 104, or nearly 20% of the 533 patients showed a positive skin reaction, diagnosis of brucellosis was established in only one of the 104 patients.

Control and Preventive Measures

THE visiting physician has an unusual opportunity to observe development of infection among those employed in the packing plant. Preemployment examination should include the agglutination test, which is apt to be negative in individuals who have not previously worked on farms or been in direct contact with livestock. From time to time after employment, serum and agglutination tests can be carried out in the state public health laboratory. Thus positive agglutination will be discovered early and sub-clinical as well as clinical infection can be watched.

2. Although wearing of rubber gloves is impractical for those who work on head and other skeletal parts, such a precautionary measure deserves consideration for those handling organs and soft tissues (Federal and lay government inspectors, employees in the offal department, etc.)

3. The attack rate is apparently highest among those working in the kill and cut department, including shacklers. Special care needs to be exercised following cuts and injuries that receive care in the first aid department. During convalescence, assignment to less hazardous work should be arranged.

4. It is likely that bannisters, elevators and other surfaces frequently contacted by human hands, especially on the killing floor, may become contaminated with brucella. Such areas need frequent washing with soap and antiseptics as this type of contact may account for occasional infections among office and white collar workers

when going through the plant. Sanitation in general should be maintained on a high level.

5. It is hoped that a vaccine or an antigen may become available which would markedly increase resistance against infection.

6. Prevention of brucellosis in industry is further dependent upon control of this disease in animals. This infection is not inherent in industry but is introduced from without and in a real sense represents an essential part of the whole program of measures for the eradication of brucellosis in farm animals.

Summary

CONSIDERATION is given to the subject of brucellosis as related to industry. Discussion is based on epidemiologic investigation and on a series of 2,405 case reports assembled during the period, 1940-1946, through interest and courtesy of Iowa physicians.

Disregarding 25% of the patients who gave no history of contact with animals, attention is directed to the larger number (75%) in Iowa who give the history of direct contact with farm animals, (hogs, cows, sheep, goats) prior to onset of symptoms. Illness in this group is shown to be closely associated with occupations including male farm workers, packing house employees, veterinarians, stock dealers, locker and rendering plant workers. Special consideration is given to the meat packing industry, to measures aimed at eradication of brucellosis in farm animals and at prevention of human illness. With cooperative effort on the part of all interested agencies and individuals, it is certain that continued application of control and preventive measures will reduce the vital hazards of direct contact with infected tissues in proportion as further progress is made toward eradication of brucellosis in farm animals.

Medical Care in Consolidated Edison

DURING the year 1947, operation of the medical department cost $1,100,000, or an average cost of $40.75 per employee. To finance this program the company contributed 65% or $715,000, with the employees making up the balance of $385,000. In this connection, it might be well at this time to explain briefly the method of financing. There are approximately 24,500 members in the Mutual Aid Society of the Consolidated Edison Co. These employee-members contribute 1% per week for each $1.80 of their basic weekly salary to a sick benefit fund maintained by the society. (Employees in salary brackets over $57 per week make a proportionately larger contribution.) The company matches this contribution, dollar for dollar, and the fund thus realized is used for the payment of sick benefits to employees who exhaust the company-sustained sickness allowance of one week's pay for each year of service. The Mutual Aid Society also maintains a sick benefit reserve fund which, at the beginning of each calendar year, is the equivalent of $4 per member. After sick benefits are paid and necessary adjustments to the reserve fund made, the balance of the joint employee-employer contribution is credited to the company to defray the operating expenses of the medical department. The net medical cost, or deficit, which remains after this Mutual Aid Society credit is applied, is borne by the company. In other words, the company's share of the credit plus the net medical cost which is paid by the company represents approximately 65% of the gross medical cost.

—DR. J. J. WITTMER, Assistant Vice-President, in *Industrial Hygiene Newsletter*, 8:5, 14, 16, May, 1948.

Fractures About the Ankle Joint

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FRACTURES about the ankle joint involve major weight bearing articular surfaces, and unless they are treated early and adequately, will result in distressing permanent disabilities.

"Potts" fractures are frequently mistreated as a result of inadequate reduction. It is essential that an early diagnosis be followed by accurate reposition, adequate retention, and diligent after-treatment.

The dictum of early reduction means easy reduction, applies to all fractures. The best method of removing the swelling and improving the circulation is the immediate restoration of the normal joint mortise.

Fresh fractures can usually be reduced by early manipulation, whereas old malunited fractures usually require operative correction.

Inadequate treatment may widen the joint mortise, disturb the weight bearing line, produce an unstable ankle, and result in a traumatic arthritis.

Children

THE distal epiphyses of the tibia and fibula are cartilaginous at birth. The ossification centers appear about the second year and the epiphyses fuse between the 16th and 19th years.

Fractures about the ankle joint are rarely observed in children as they commonly occur between the 20th and 50th year. In children, abduction and external rotation violence usually result in posterior and lateral displacement of the tibial epiphyses. After the ninth year, a triangular fragment is frequently displaced together with the epiphysis from the postero-lateral surface of the metaphyses (Fig. 7). Early reduction will usually correct the displacement and the deformity.

The prognosis as to future growth disturbance must be guarded until the epiphyses have fused.[5]

Anatomy

THE ankle joint is a synovial joint of hinge pattern. The distal end of the tibia and fibula unite to form a deep groove in which the astragalus articulates with the lower end of the tibia. The borders of the astragalus fit snugly in the angle created by the downward projection of the malleoli.

The roof, or weight bearing surface of the joint, is formed entirely by the tibia, and is wider anteriorly to accomodate the corresponding anterior part of the astragalus. The tibio-astragalar articular surface is concave in the anterior-posterior plane and convex in the lateral plane.[7] The external border of the astragalus is in line with the external border of the tibia. The continuation of the mid-longitudinal axis of the shaft of the tibia bisects the body of the astragalus in both the anterior-posterior and lateral planes (Figs. 1 and 2).

The lateral malleolus lies in a groove behind the tibia and the tip is about 1¼ cms. below and 2 cms. posterior to the tip of the medial malleolus. The medial malleolus is flat and bounded anteriorly by the tendon of the tibialis anterior muscle, and posteriorly by the tendons of the flexor digitorum longus, the tibialis posterior, and flexor hallucis longus.

The synovial membrane of the joint lines the thin capsular ligament which surrounds the joint. The capsular ligament is weak anteriorly and posteriorly, but is strengthened by the collateral ligaments and tendons of the leg muscles.

The tibial collateral ligament (deltoid) is made up of several bands which fan out from the medial malleolus, namely, the tibio-navicular, the anterior and posterior astragalo-tibial, and the calcaneotibial ligaments.

The fibular collateral ligament is made up of three separate bands, namely, the calcaneofibular, the anterior, and posterior astragalo-fibular ligaments. The posterior fasiculus is the strongest and maintains an inseparable attachment between the external malleolus and the astragalus. The tibial and fibular collateral ligaments stabilize the astragalus in the joint mortise.

The distal tibio-fibular joint is a syndesmosis united by an interosseous ligament, which is continuous with the interosseous membrane. This joint is reinforced by the anterior, posterior, and inferior transverse ligaments.

Physiology

FLEXION and extension at the ankle joint take place about a transverse axis through the body of the astragalus and are almost entirely in the antero-posterior plane. Excursion at the ankle joint ranges from 70 to 150°, dorsiflexion ranging 20° and plantar flexion 60° degrees. In dorsiflexion, the wider anterior part of the astragalus is rotated posteriorly into the narrower posterior portion of the tibio-fibular groove, thereby tensing the interosseous and transverse tibio-fibular ligaments. In plantar flexion, the narrower posterior part of the astragalus rotates anteriorly into the wider anterior portion of the groove, thereby releasing the ligamentous tension. Motion at the tibio-fibular joint is entirely passive, owing to the rotation of the astragalus in the tibio-fibular mortise.

A series of roentgenological studies in dorsi and plantar flexion, failed to reveal any significant widening at the tibio-fibular joint, in spite of various findings in the literature.[1]

Inversion and eversion are performed at the sub-astragaloid joint, and extreme motion is restrained by the collateral ligaments of the ankle joint. The combined motion of inversion and ad-

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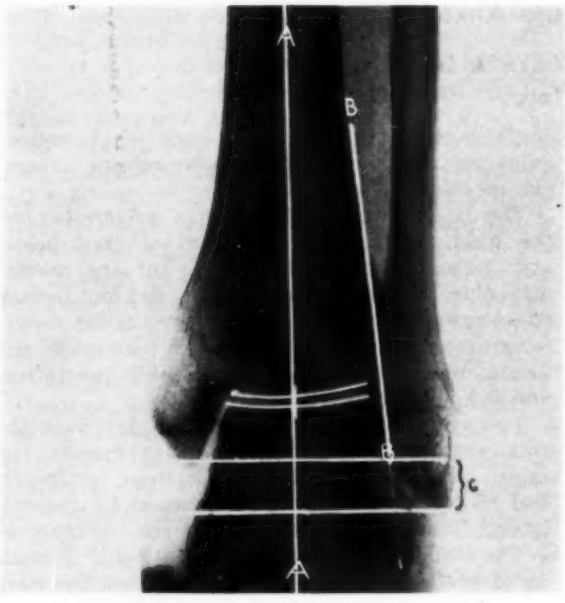

Fig. 1.
AA—Weight bearing line. BB—External border of astragalus is in line with the external border of the tibia. C—Tip of external malleolus is 1¼ cms. below top of internal malleolus

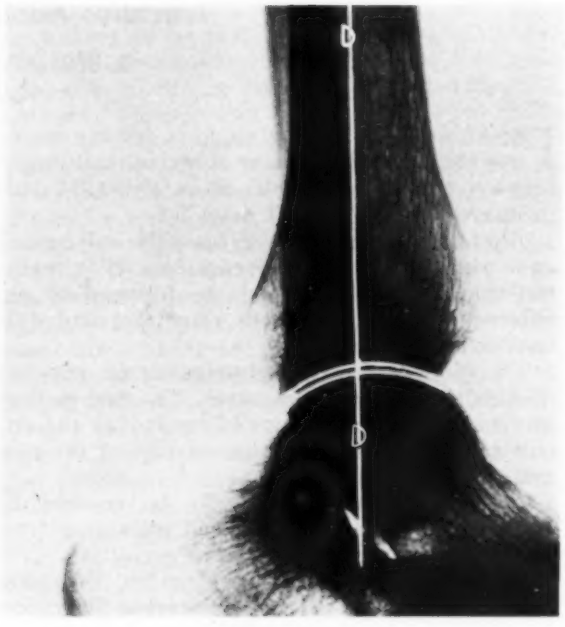

Fig. 2.
DD—Lateral weight bearing line

duction is supination, and that of eversion and abduction is pronation.

Mechanism of Fractures

INDIRECT violence, acting through the astragalus frequently creates a fracturing force. Direct violence is seldom responsible for fractures occuring at the ankle joint. There are usually four types of indirect violence responsible for fractures about the ankle joint.

1. EXTERNAL ROTATION: A torsional force is applied, either externally rotating the foot on the fixed leg or internally rotating the leg on the fixed foot. The astragalus rotates externally, thereby transmitting the force of the fibula with a resultant spiral or oblique fracture beginning about 2½ inches above the tip of the external malleolus. The line of fracture passes downward and forward through the tibio-fibular syndesmosis to end at the level of the ankle joint. If the force continues, either the tibial collateral ligament tears or the medial malleolus gives way. External rotation is the most common form of indirect violence and rarely involves the inferior tibio-fibular ligaments.

2. ABDUCTION: The foot is forcibly abducted on the fixed leg, and either the tibial collateral ligament tears, or the medial malleolus fractures (transversely). If the force continues, the inferior tibio-fibular ligament ruptures, and the fibula fractures transversely about 2½ to 3 inches above its tip as a result of the angulating strain. Excessive violence may result in co-existing marginal fractures.

3. ADDUCTION: The foot is forcibly adducted on the fixed leg and either the fibular collateral ligaments tear or the external malleolus fractures (transversely). The continued thrust of the astragalus against the internal malleolus causes it to fracture secondarily, the line of fracture running almost vertically or obliquely, and the astragalus is displaced medially. Excessive violence may result in a supra-malleolar fracture of the tibia. Adduction violence may occasionally produce an isolated fracture of the medial malleolus at its base.

4. UPWARD COMPRESSION: Fractures about the ankle may occur as a result of compression in the long axis of the leg. The tibia gives way instead of the os calcis or astragalus, resulting in a marginal fracture of the tibia, or a severe comminution of the articular surface of the tibia. The astragalus together with the foot is displaced posteriorly on the tibia by the posterior muscles of the leg. Compression injuries may produce diastasis of the inferior tibio-fibular joint as the astragalus may be driven between the separated tibia and fibula, resulting in a tearing of the ligament and the interosseous membrane. Tibio-fibular diastasis rarely occurs without a bimalleolar fracture. Posterior marginal fractures may occur without malleolar fractures as a result of forced plantar flexion of the foot. Marked dorsiflexion may fracture the anterior margin of the tibia with resultant upward and anterior displacement.

In trimalleolar fractures, the posterior marginal fracture is usually displaced upwards, the internal malleolus is displaced downwards and laterally, and the lower end of the fibula is displaced posteriorly. In classical trimalleolar fracture, the posterior fragment involves one-third or more of the articular surface.[10] The closer the line of fracture to the apex of the concavity of the tibial articular surface, the greater the

difficulty in maintaining the reduction. In small marginal fractures, there is sufficient articular surface of the tibia to hold the convex astragalar surface.

Diagnoses

A THOROUGH understanding of the anatomy, physiology and the mechanism of forces is essential to establish an early diagnosis.

An accurate description of the injury will determine the mechanism responsible for the fracture. Dysfunction is the result of widening of the joint mortise and alteration of the weight bearing line (Fig. 3).

The diagnosis is obvious in those cases presenting the typical deformity, with postero-lateral displacement, plantar flexion, and eversion of the foot. Generalized swelling may obliterate the bony landmarks of the ankle joint. Non-displaced fractures may often be overlooked. The elicitation of abnormal mobility and crepitus may be harmful to the patient.

Posterior marginal fractures may reveal undue prominence of the tibia and abnormal mobility of the ankle joint with a tendency to recurrence of the deformity following reduction. Posterior marginal fractures with posterior displacement of the foot usually restrict dorsiflexion. X-ray studies in the antero-posterior, lateral and oblique planes are essential to corroborate the clinical diagnosis[2] (Fig. 4). The oblique view may reveal fractures of the fibula and posterior malleolus not detectable in the anterior-posterior and lateral views[4] (Figs. 5A and B).

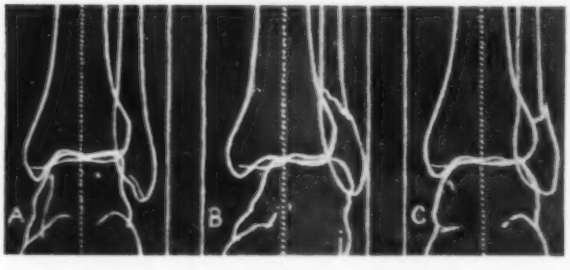

Fig. 3.
A—Normal weight bearing line. B—Displacement of weight bearing line as a result of fracture. C—Reduction and restoration of weight bearing line

If the fibular collateral ligament is avulsed, inversion occurs at the ankle joint as well as the sub-astragaloid joint. The astragalus moves away from the external malleolus and a well defined sulcus is present. X-ray studies in inversion and eversion in the anterior-posterior plane may be necessary to detect the subluxation of the astragalus as a result of rupture of the fibular collateral ligament. It may be necessary to inject 2% novocain into the injured ligament to relax the spasm and demonstrate abnormal lateral mobility.

Clinical signs of diastasis of the tibio-fibular joint will hinge upon the presence of co-existing fractures.[3] Localized swelling and tenderness

Fig. 4.
X-Ray of ankle joint in the oblique view

over the tibio-fibular joint and absence of the swelling below the malleoli are diagnostic findings of tibio-fibular diastasis. The most common ligamentous injury at the ankle joint is a tear of the anterior tibio-fibular ligament.

Treatment

IMMEDIATE reduction is imperative in displaced fractures. The mechanism of reduction is the reverse of the mechanism of the fracture.

The anatomical relationship of the ankle joint must be restored so that the weight bearing axis passes directly through the center of the joint mortise. Reduction must re-establish the normal alignment in both the anterior-posterior and lateral planes, and at the same time, replace the malleoli in their normal position so that they grasp the body of the astragalus.

The methods of treatment of fresh displaced fractures are manipulation, traction, and open reduction.

1. MANIPULATION AND PLASTER: Manipulation and reduction are performed under anesthesia. The knee and hip joints are flexed during this procedure. In abduction and external rotation fractures, the posterior portion of the foot with the displaced astragalus is forced medially, and anteriorly, thereby correcting the lateral and posterior displacement (Fig. 6D). The astragalus is forced medially so that it rests against the internal malleolus, and the fractured malleoli are squeezed into their anatomical position, thereby realigning the astragalus with the malleoli. Inversion occurs at the sub-astragaloid joint and does not correct the displacement at the ankle joint (Fig. 6C). The foot is maintained in the neutral position, as marked dorsiflexion places tension on the ligamentous structures.

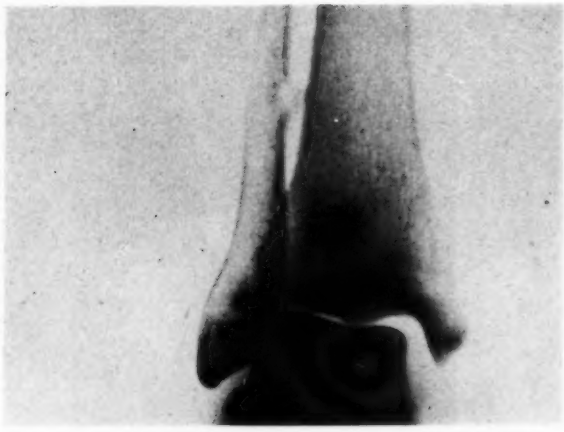

Fig. 5 (A).
Fracture of shaft of fibula. Separation of medial malleolus away from the astragolus

If the medial malleolus is fractured at the base, the astragalus may be displaced too far medially due to lack of structural support, and thereby widen the mortise. Open fixation of the medial malleolus will then be necessary to maintain the fracture and the joint mortise.

In adduction fractures, the manipulation is reversed in order to re-establish the joint mortise, and the foot is maintained in the neutral position. It is essential that marginal fragments are accurately reposited in order to restore the smooth articulating surface of the tibia. In trimalleolar fractures, the posterior and lateral displacements of the foot are corrected. The foot is then maintained in dorsiflexion, thereby tensing the posterior ligament which molds the triangular fragment into its normal alignment and retains it in that position. If the posterior marginal fragment is not reduced properly, a sulcus will be present between the anterior portion of the tibia and the posterior fragment, with the astragalus spanning this defect.

Fractures involving more than one-third of the posterior tibial surface require fixation of the foot in partial equinus, as dorsiflexion will result in posterior dislocation of the foot due to lack of support of the posterior portion of the articular surface. Fractures of the anterior tibial margin require reduction by strong plantar flexion, the anterior capsular fibres pulling down the displaced fragment.

Late cases may require manipulation over a wedge or the use of a Thomas wrench to break up the fibrous union. The marginal and malleolar fragments cannot always be anatomically reduced, but the astragalus must be replaced in the mortise to re-establish the normal weight bearing line.

Reduction of displaced fractures is maintained by a plaster cast extending from the toes to the mid thigh with the knee held in flexion. The lower extremity is placed on a pillow and the foot is observed for cyanosis, temperature change, and motor power of the toes.

The period of immobilization varies with the extent of the osseous and ligamentous change. Non-displaced fractures usually require four to six weeks, whereas, displaced fractures may require six to eight weeks immobilization. Frequent x-ray check-ups are indicated to assure maintenance of reduction, and early motion should be instituted when consistent with maintenance of reduction. Non-displaced fractures can be immobilized in a walking caliper cast to permit early ambulation. In displaced fractures, the original plaster is changed in three to four weeks to a snugly fitting walking caliper cast extending to the tibial tubercle. Adequate reduction and early ambulation stimulate callous formation, prevent atrophy of the osseous and soft tissue structures, and stiffness of the ankle.

Following the removal of the cast, a shoe is worn with a longitudinal arch support, and a

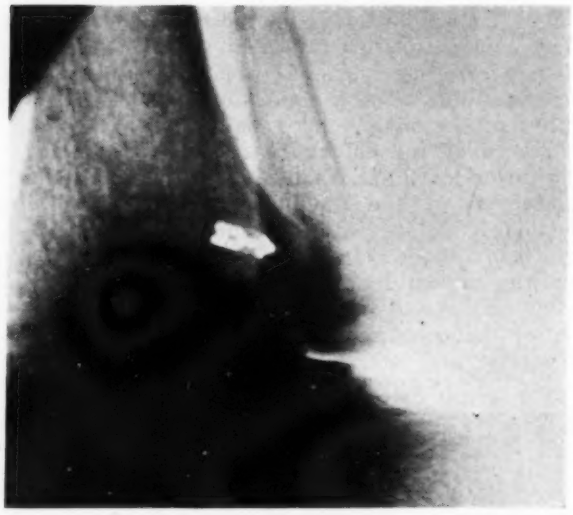

Fig. 5 (B).
Oblique view revealing fracture of the posterior malleolus, not visible in the other views

¼-inch wedge on the inner side to maintain the inverted position of the foot. The wedge is worn for several months to support the foot and maintain the arch. In old cases, a reinforced leather anklet may relieve the pain.

2. TRACTION: The os calcis is transfixed with a Kirschner wire, and about 8 to 10 lbs. of skeletal traction are applied for several weeks, followed by the use of a walking caliper cast.

Traction is reserved for the following indications:

(a) Extensive comminution of the lower tibia, as in explosion fractures with complete shattering of the articular surface of the tibia. A spontaneous painless anklyosis in good weight bearing position is considered a good end result.

(b) Large posterior marginal fractures which cannot be maintained by manipulation.

(c) Extensive trauma to the skin and soft tissues which will not tolerate manipulation.

(d) Compound fractures.

3. OPERATIVE: Manipulation may be ineffectual when the fractures cannot be reduced or maintained. Operative reduction, when indicated, should be done within 48 hours after the injury.

1. *Malleolar Fractures:* Fractures at the base which are rotated or cannot be replaced due to interposition of soft tissues, require open reposition and internal fixation in order to realign the joint surface and restore the structural support. The interposed soft tissues, periosteum, and fibres of the collateral ligaments must be removed, and the fragments are fixed by means of wires, vitallium screws, or chromic catgut anchored through drill holes.

2. *Marginal Fractures:* Fractures that cannot be reduced by manipulation of traction, require open correction and fixation. Dissection and exposure of the marginal fracture may compromise the blood supply, and result in avascular necrosis of the bone with a painful, stiff ankle in spite of an accurate reduction. The anterior margin of the tibia is exposed through an anterior incision, whereas the posterior malleolus can be approached by a curved incision posterior to the medial malleolus. The posterior tibial vessels, nerve, and the three tendons, are retracted anteriorly. Preliminary drilling of the marginal fragment facilitates the fixation. The fragment is then reposited anatomically and anchored to the tibia by means of a vitallium screw.

3. *Compound Fractures:* The distal end of the tibia may be driven through the skin due to the subcutaneous position of the tibia. Compound fractures may follow direct or indirect violence so that the displacement is not as typical as it is in simple fractures. Debridement is performed, the fragments are replaced, and the reduction is maintained by traction or a plaster cast.

4. *Dislocated Posterior Tibial Tendon:* Occasionally, a dislocated posterior tibial tendon may complicate fractures about the ankle joint[9]. The displacement occurs when the foot is actively dorsiflexed. At operation, the displaced posterior tibial tendon is replaced, and maintained in its normal position.

5. *Tibio-Fibular Diastasis:* The separation is corrected and maintained by nails, screws, beaded wires, or some form of compression apparatus (Weeldon or redresseur clamp). The fixation is removed when the ligaments have healed.

Old Fractures

MALUNION at the ankle joint may result in continuous pain, complete restriction of motion and permanent economic disability. The findings may vary from a mild swelling about the ankle with pain and restricted motion, to marked deformity and distortion of the mortise with complete inability to bear weight. Restriction and dorsiflexion may result in weight bearing on the forefoot. Valgus deformity is common, the foot being displaced laterally on the leg. Traumatic arthritis may be the result of a severe injury to the articular cartilage with subsequent degeneration of the cartilage or repeated traumata from bearing weight upon an unreduced fracture at the ankle joint. The irregular intra-articular pressure produces changes in the bone, articular cartilage, synovia, and capsule. These changes are characterized by sclerosis of the bone adjacent to the joint with or without the formation of spurs, narrowing, irregularity of the joint line, and thickening of the synovia and capsule.

Treatment

OLD fractures at the ankle usually require one of the following open operative corrections.

(a) *Excision of Fragments:* An ununited malleolar fragment may be excised when it is a source of pain and blocks the motion, provided that its absence will not cause instability of the astragalus in its mortise. Stability of the astragalus is maintained by the base of the malleoli, and the collateral ligaments.

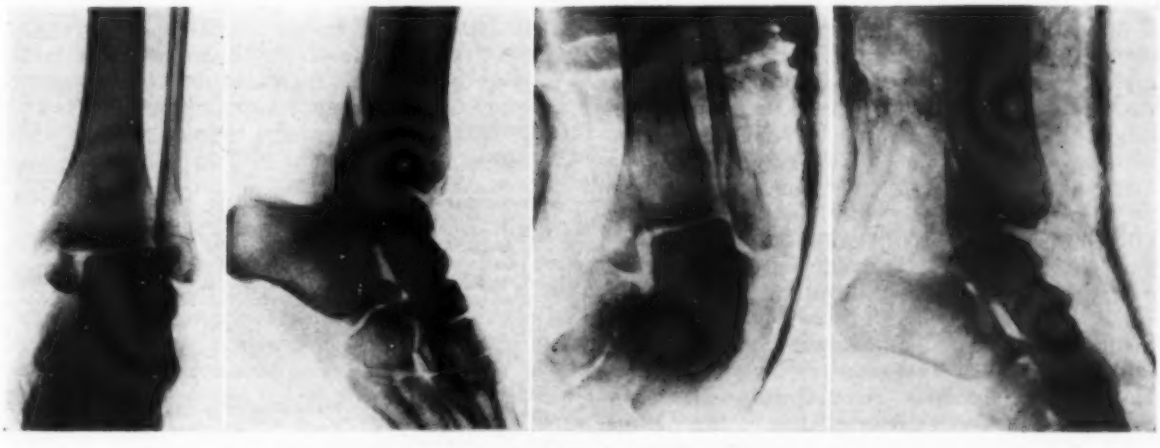

Fig. 6.

Left to right: (A) Trimalleolar fracture with lateral displacement of the foot. (B) Trimalleolar fracture with posterior displacement of the foot. (C) Inadequate reduction with widened mortise, as a result of marked inversion at the sub-astragoloid joint. (D) Inadequate reduction with posterior displacement of the foot

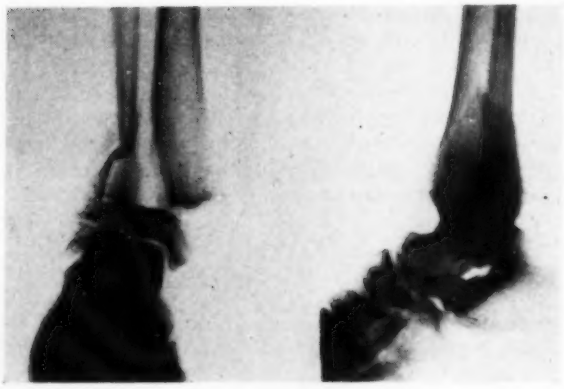

Fig. 7 (A).
Epiphyseal fracture and displacement

Fig. 7 (B).
Reduction and retention of epiphyseal fractures and displacement

(b) *Fixation of the Fragments:* Nonunion of the internal malleolus at its base may lead to loss of the medial support of the ankle mortise with resultant inward rotation of the astralagus, valgus deformity of the foot, and traumatic arthritis. Treatment consists of freshening of the fractured surfaces and excision of the interposed fibrous tissues, allowing reposition of the fragments. Fixation is maintained by means of catgut or wire sutures, [11] vitallium screws, or a small match graft.

(c) *Osteotomy:* Supra-malleolar osteotomy will correct the weight bearing axis, but is contra-indicated if the articular surface of the tibia and astragalus is irregular, or if traumatic arthritis is present at the ankle joint. In bimalleolar malunion, longitudinal incisions are made over each malleolus. The tibial osteotomy is performed either at the fracture site or above the fracture line, and the fibula is osteotomized obliquely at the fracture site. Interposed fibrous tissue is removed allowing the astragalus to be replaced in the mortise. The osteotomized fragments are usually controlled by traction or fixation. The osteotomized fibula usually does not require internal fixation.

(d) *Arthrodesis*: Fusion of the ankle joint is indicated for traumatic arthritis and less commonly for infections and flail joints. Arthrodesis is an effective means of converting a painful, useless, joint into a painless, useful articulation. The indications are old unreduced fractures with disruption of the mortise and traumatic arthritis. These cases usually suffer from an incongruity of the articular surface, instability of the joint, contractures of muscles, tendons, ligaments, and trophic disturbances.

Arthrodesis relieves the peroneal and anterior tibial muscle spasm, and compensatory movements develop at the mid-tarsal and sub-astragaloid joints. Old fractures are frequently associated with a fixed equinus deformity which may require correction by lengthening of the Achilles tendon. Tilting into varus or valgus must be corrected. The foot is fused in five degrees of equinus as excessive equinus or calcaneous will result in an awkward gait.[12] Arthrodesis with the foot at a right angle would be satisfactory in individuals not requiring the use of shoes.[8] Fusion in the dorsiflexed position will result in flexion of the knees in order to allow the foot to come in contact with the ground. Immobilization in plaster is necessary for about 12 weeks.

The end results are excellent, with weight bearing on a painless, stable, fused ankle joint.[6]

Summary

EARLY reduction of fresh fractures will reduce the incidence of malposition and malunion.

2. Fresh fractures are treated by manipulation, traction, or open operation.

3. Manipulation and traction may be ineffectual in displaced malleolar and marginal fractures and require open operation. Compound fractures and dislocations of the posterior tibial tendon are primary operative indications.

4. Old fractures usually require some form of operative correction.

5. The treatment of ununited malleolar fragments will depend upon the site of the fracture. Fractures below the base may be excised, whereas fractures at the base require fixation to stabilize the astragalus.

6. Osteotomy is contra-indicated in cases presenting irregularity of the tibio-astragalar joint.

7. Arthrodesis is indicated in old unreduced fractures with traumatic arthritis, in order to convert a useless, painful joint into a stable, painless ankle joint.

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Current Official Industrial Hygiene Activities

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LAST year industrial hygiene proclaimed that it had reached maturity, a development which was characterized by several distinct features. The Federal Industrial Hygiene Division had undergone a revamping of functional structure for greater efficacy of operation. State and local units had increased and expanded. There was also an increasing acceptance of our activities on the part of labor and management and a keener congressional appreciation of the role of industrial hygiene, reflected by appropriations.

Also 1947 was a signal year in that we divested ourselves of the fetters of wartime exigencies. Although a devastating conflict is bound to leave certain indelible traces, still the war was sufficiently far behind us so that we could resume normal planning. We had also lived with some of our difficulties long enough to be able to devise means of circumventing and overcoming them.

After one year's operation in our new stature, it is time for an honest appraisal of ourselves. We shall need to determine whether our strides have kept pace with our maturity or whether we are still toddling along. We shall have to analyze critically whether we have matched our more mature, experienced grasp and understanding with vigorous action and a more effective approach.

It is indeed time to pause and take stock.

Administrative Status

SINCE our last meeting, a new unit has been added to the roster, making a total of 58 industrial hygiene units now functioning on a full- or part-time basis in the states and territories. These units employ approximately 400 professional and technical workers. They may be broadly classified into engineering and chemical personnel, constituting 64%; medical and nursing personnel, 21%; and technicians, sanitarians, and others, 15%.

These 58 units budgeted $195,000 more this year than last year for industrial hygiene activities. The total for this year is $2,405,000. Of this amount, 43% is derived from state and local funds and 57% from Federal funds. It is significant that the states budgeted $408,913 of Federal funds above the amount allotted for industrial hygiene and that state and local funds for the current year reflect an increase of about $153,000 over last year.

When we scrutinize the budgets of the individual units, however, we find that only 30% showed increases in funds over last year, whereas 42% showed decreases averaging about 12%. This indicates a need for more spadework at the state level for additional funds to develop and implement well-organized programs.

Activities of State Units

A COMPLETE summary of unit activities is impossible at this time because of the paucity of reports. The 34 reports received represent the lowest score for the past several years. Since a composite picture cannot be obtained until all the pieces are put together, this negligence hampers an accurate, nation-wide appraisal of industrial hygiene activities. I should therefore like to urge you to give careful attention to this important matter of reports in the future.

From the limited number of reports at hand, we find that, in 1947, 29,000 different services were given to 21,000 industrial establishments employing 4,326,000 workers. These figures represent an increase over the previous year in volume of services and in the industrial population reached; 70% of the total services rendered, dealt with environmental control; 17% involved medical, dental, and nursing programs, including control of occupational diseases; and 13% consisted of follow-up investigations regarding the status of recommendations. Recommendations for improvement of services or for control of hazards covered 22% of the workers involved in the investigations. Reports indicate, however, that the recommendations were carried out for only one-half of these workers. If we had complete and standard reports from all active units, I am sure the story would be more favorable. I look forward to more complete reporting so that a truer picture may be reflected in the future.

A review of highlights of individual state programs reveals that preliminary surveys of industrial health hazards and facilities are now being undertaken in several states. Contingent on the results, permanent industrial hygiene units may be established. Other areas are conducting statewide surveys, on the basis of which legislation will be proposed regarding occupational disease control and compensation.

A comparatively new wrinkle in an industrial hygiene program is the evaluation of the occupational health hazards of agricultural workers. The North Dakota unit is undertaking such a project and will also seek to promote an adult health program for this group. Kansas is planning to cooperate with the recently established University of the Wichita Foundation for Industrial Research in a similar study. Other agricultural states may consider such programs.

Several state-wide studies have been completed, including studies of the fire-brick industry and brass foundries in Kentucky, laundries and dry-cleaning establishments in Pennsylvania and Utah, the shoe industry in New Hampshire,

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and mercury hazards in seed treating plants in Minnesota. Effects of exposure to radiation from x-ray machines and radioactive substances have been the subject of studies in a number of states.

It is noteworthy that many of the surveys conducted in industry are made at the request and with the cooperation of labor unions. Further evidence of labor's growing interest is the increasingly frequent inclusion of health and welfare clauses in labor-management contracts.

Industrial hygiene units continue to be consulted on atmospheric pollution problems, sometimes even aiding in the preparation of city ordinances and charter amendments. The New York unit recently assisted the city of Niagara Falls.

Prevention of needless deaths by proper control was demonstrated in Tennessee during the construction of the Mississippi River bridge. The industrial hygiene engineer and nurse jointly supervised the decompression of caisson workers, thereby contributing to the elimination of fatalities from bends.

Representative of the states sponsoring physical examination programs in industry, Mississippi is examining all workers in the state in cooperation with the state medical society. The cost is being defrayed by industry itself. In addition to determining the incidence of occupational disease, this survey will reveal the general health status of Mississippi workers and also serve as a case-finding tool for tuberculosis, venereal disease, and cancer control agencies.

There is wide diversity in the programs projected by the various states, ranging from an electrocardiographic study which will be undertaken in Wisconsin to in-plant feeding workshops sponsored in the St. Louis and Kansas City areas. A unique program of industrial sight conservation has been inaugurated by the New Jersey division. Workers are given ophthalmic examinations for near and distant vision, work distance vision, color and depth perception, and major eye defects. Akin to this venture is the four year study which Oregon is conducting among high school students to relate visual capacity to vocational guidance and placement. Oral health, too, is gradually assuming its rightful place in industrial hygiene. The Pennsylvania unit plans to study the oral health of workers in the Philadelphia area to determine industrial hazards affecting the teeth and oral tissue.

Progress is also reported in the establishment of industrial nursing services in plants as the result of conferences between industrial hygiene personnel and management. For example, seven plants in Los Angeles county established these services for the first time, and 12 plants in Tennessee initiated nursing programs.

Federal Industrial Hygiene Highlights

ON THE Washington scene, our activities have run the gamut from consolidating our operations to completing additional studies.

The anticipated completion of the industrial hygiene laboratory at Bethesda will bring to fruition plans for extensive toxicological, medical, dermatological, dental, and engineering research. Through the formation of a Radiant Energy Unit, the division is providing technical assistance to states regarding the evaluation and control of radiological hazards. Demands for information on health and welfare services have increased multifold. At the request of the United Mine Workers, we are assisting with the development of a medical care plan for that group.

Field activity has been hampered during the past year by lack of travel funds, but this limitation is expected to improve. The preliminary survey of foundries in Illinois has been completed, and the final study is now underway. The study of health hazards associated with the use of sodium fluoride in open hearth operations in steel industries has been completed, and a final report is in preparation. There are several other important studies on the agenda, including the use of beryllium and its compounds.

Among other activities have been re-surveys of the U. S. Mints and studies of lighting and noise levels before and after office decoration. We have also conducted investigations for Federal agencies in cooperation with state units.

Concentrated efforts have been made by the division toward the integration of full courses in industrial hygiene in undergraduate and graduate curricula. More and more frequently we have been asked to participate in developing academic programs for industrial hygienists, and we have cooperated by detailing staff members to serve temporarily as instructors. A list of educational opportunities in industrial hygiene has been compiled by the division and appeared in the April issue of the *Industrial Hygiene Newsletter*. If the possibility of grants in aid to universities materializes, we can look to a further expansion and strengthening of academic preparation in this field.

Information-wise, we have complied with numerous requests for exhibits to be shown at all leading conventions and for use by local chambers of commerce, health museums, labor, and other groups. The division has also assisted in the orientation of 56 visitors from 20 foreign countries who came to see us during the past year seeking information about industrial hygiene activities and administration. The *Industrial Hygiene Newsletter* has consistently expanded in coverage. Since June 1946, when it was first issued in printed form, its circulation has grown from about 3,000 to 6,000, and it has been placed on a subscription basis.

Optimum Operations versus Actual Practice

WHILE the foregoing summary points out conclusively that industrial hygiene has been put into practice generally throughout the United States, finding expression in a diversity of programs, we must now ascertain the magnitude and effectiveness of this activity.

In order to establish criteria whereby we can measure this progress, let us consider the structure and functions of a well-organized, efficiently operating unit. Then we can make our own individual comparisons to find out how short of the mark we fall or how closely we approach optimum operations.

PERSONNEL SHORTAGE: First and foremost, we have the question of staff. Without adequate personnel, even the best laid plans are incapable of consummation, for the necessary manpower is lacking to translate them into action. Most units are hard hit by this problem. A recent canvass of vacancies among state and local governmental industrial hygiene agencies reveals the existance of 71 vacancies for which funds are available. The greatest need is for medical and engineering personnel. A list of these vacancies, giving name and address of agency, title and grade of position, and annual salary range, is available upon request from the Industrial Hygiene Division of the U. S. Public Health Service. Copies of the list have been sent to universities offering full courses in industrial hygiene.

Because of these personnel deficiencies, only 42% of the units are able to offer industry a rounded industrial hygiene program consisting of essential medical, nursing, engineering, and chemical services. The resultant restriction of service applies not only to the type of service given but also to the proportion of industries assisted. There is a further limitation from the standpoint of geography, in that not all areas are reached by currently functioning staffs. With the exception of about a half dozen states, the services by state and local units may be considered inadequate.

A problem related to dearth of personnel is the inadequate training of those already on the job. Personnel in at least one-fourth of the units need additional training and experience in industrial hygiene. The situation becomes graver when you consider that a large percentage of these inadequately qualified personnel shoulder considerable responsibility for the program.

Another aspect of the over-all difficulty is the diversion of personnel to other duties. Demands made by other divisions for non-industrial hygiene work are tantamount to a dwindling of staff.

That is an internal problem which must be corrected locally for the best utilization of available personnel in industrial hygiene activities.

The war-fostered excuse of shortage of personnel, which we claimed as an extenuating reason for operational deficiencies, is no longer tenable. This is one of the difficulties that we have lived with long enough to be able to dissipate. Instead of pirating industrial hygienists—which does not increase our professional reservoir but merely makes it volatile—we can look to the universities for young graduates. We can augment the expanding facilities of the universities with our own on-the-job training. With proper utilization of professional personnel, we can shift some of the more routine tasks to non-professional workers, thus drawing on another source of manpower. Perhaps low salary scales in your state do not attract employees. It is up to you to work toward bringing them more nearly in line with other states. This problem of staff can and must be solved if you are to make a significant contribution to industrial health.

Another weakness which must be corrected is crowded or inadequate quarters. Maximum efficiency is not possible when you only share desk space with other divisions or when laboratory space is separateed from office quarters or is not available.

That, too, must be tackled locally.

LEGISLATIVE NEEDS: A further characteristic of a properly functioning unit is the support afforded by enabling legislation. There are seven states at present in which the need for such legislation is indicated. Duplication of effort and jurisdictional confusion would be eliminated through the passage of legislation vesting the health department with responsibility and authority for industrial hygiene activities. Only 23 states have this type of legislation to date, and it is vital that the others promote the passage of similar laws.

While striving for legislation conducive to the most effective operations, state units must not lose sight of the value of cooperating with other agencies. Much good will and actual accomplishment can accrue by a willingness to serve other governmental bodies, and no loss of identity or responsibility need be implied.

Further legislative criteria for optimum conduct of industrial hygiene activities are adoption of laws on occupational disease compensation and reporting; 39 states, the District of Columbia, Hawaii, Alaska, and Puerto Rico now have legislation which provides compensation to workers for one or more occupational diseases. Coverage is full in 16 states, the District of Columbia, Hawaii, and Alaska, and of the schedule type in 23 states and Puerto Rico. Legislation of occupational disease compensation was passed in 1947 in the states of Iowa, Nevada, South Dakota, Tennessee, Texas, and New Hampshire.

Occupational diseases are reportable to health departments by statute or regulation in 26 states. The last state to require reporting was Arkansas. In 1947, 11 states reported 25,624 cases of occupational disease, of which 60% were dermatoses, 11% conjunctivitis, 3% systemic poisoning, and 4% were cases of silicosis or other pneumoconioses. The remainder included infections, inflammations, and respiratory conditions; 90% of the reports consisted of claims for compensation, and only 10% of them were made by physicians.

A promotional job is indicated in these legislative areas. Attention should also be given to the preparation of industrial hygiene codes where they are lacking or need strengthening.

OCCUPATIONAL DISEASE CONTROL: The dominant sphere of activity of a properly functioning unit is the basic practice of industrial hygiene. Too many states have interpreted this to mean adult public health work and have dispersed their energies in conducting TB, VD, and other case-finding programs. As a result, occupational disease control—which is the heart of any industrial hygiene program—has been slighted. This is evidenced by the fact that the occupational disease picture has not changed materially in the past few years.

The sole function of the industrial hygiene agency in a general adult health program is to provide an entree to industry for the organizations responsible for such work. It does not devolve upon the unit to actually execute these programs. There are too many unsolved occupational disease problems and unexplored fields clamoring for attention to warrant such deviation. The bulk of the state units' time should be spent in evaluating the hazards inherent in various industries and recommending methods for their control. Simultaneously, the promotion of other health programs can be undertaken, but efforts should be limited to laying the groundwork for other divisions in the health department and for interested voluntary agencies.

If a proper occupational disease control job is being done, the unit will be beset with requests from industry, labor, and civic groups for environmental surveys. Such requests will arrive in direct proportion to the efficacy of the operation. However, over and above these requests, the unit has to initiate services on its own. Merely existing as a service agency will not fulfill its function. The unit must seek out the major industrial hygiene problems in its area, both on an industry and state-wide basis.

When the studies are completed and the findings made available, the unit then has a selling job to do in getting industry to carry out the clean-up work. It should act only in an advisory capacity, thus conserving its energies for the determination of hazards in other fields. In this connection, the units should conduct state-wide surveys on an industry basis rather than on a hazard basis. This will make for more comprehensive and profitable studies, and allow a more productive use of available facilities. Better results can be achieved, too, through cooperation with unions and trade groups. It would also behoove the units to strengthen their relations with various state agencies, medical societies, and other organizations for mutually beneficial cooperative ventures.

One of the major shortcomings of present practice is the disproportionate number of follow-up visits. It is preferable to do fewer good studies and to follow them up until the recommendations are complied with than to initiate numerous studies with no subsequent investigations. The futility of the latter course is obvious.

Dependent on obtaining adequate personnel, units in the larger industrial areas should think in terms of decentralization. Highly industrialized states have found it easier to cope with hazards by setting up district offices in different geographical areas. In the past these groups were not too prone to assist in industrial hygiene programs, but they are now showing their interest and desire to cooperate in many ways.

Once the basic pattern of industrial hygiene practice is orthodoxly established and followed, new tie-in promotional threads can be woven into its fabric—health and welfare programs, for example, and mental hygiene. Expansion of adult health activities must not detract from the fundamental program of control of occupational diseases, however, for the latter function is the paramount duty of the industrial hygiene unit.

REQUESTS FOR ADDITIONAL FUNDS: Most of the difficulties confronting the states can be mitigated, if not completely solved, by an increase in state funds appropriated for industrial hygiene. It has been demonstrated repeatedly that one of the best means of obtaining an adequate appropriation is by supplementing budgetary requests with a statement of proposed activity. Though this budgetary justification is elementary procedure in administration, it is surprising that a number of the states have not conceived of the desirability of drawing up such a presentation. They have been content to let the blueprints of contemplated programs rest in their heads instead of setting them down on paper to bolster their requests for funds. Lawmakers cannot be presumed to be mindreaders or so thoroughly conversant with industrial hygiene activities that they can anticipate your future moves. Make it a cardinal rule to accompany each request for appropriations with a well-developed plan of activity for the forthcoming fiscal year, and give your plan strength and backbone by listing the most compelling reasons for these projects and backing them with supporting evidence.

Prognosis

IN CONCLUSION, our review of progress, weaknesses, and potentialities has revealed some very real problems, some of which have existed for years. Not being ephemeral, they will not vanish overnight. The thought that I should like to leave with you, though, is that they are capable of solution. Dispelling these problems may not require the classic blood, sweat, and tears, but it does call for the exertion of considerable effort and ingenuity. That is not too much to expect, for you are adult units now, freed of the forebodings and uncertainties of adolescence. The horizons ahead are as broad as you choose to make them. With application, diligence, and vision, the year ahead can be one of great productivity, ushering us into a golden era of industrial hygiene. That is a dream worth dreaming and capable of achieving.

May our next conference report progress in its realization.

Red Blood Cell Stippling in Negro Workers —A Study of Cases of Lead Absorption among Jamaican Negroes Observed by the Authors at the National Lead Company, Atlantic Branch, Perth Amboy, New Jersey—

WM. C. WILENTZ, M.D., and CHARLES MOLCSAN, M.T.

THERE prevailed a general man-power shortage throughout this area during the war but our shortage was further complicated by the additional factor that the laborers in this locality had a fear of lead exposure—which we term "plumbophobia." This phobia is of many years duration and exists wherever lead industries prevail. This is most unfortunate and is due to the fact that too many men who have too little clinical experience in this field write too many unsupported articles and thus freely disseminate information about this metal which is untrue, misleading and exaggerated.

During April, 1945, when the peak of our manpower shortage developed and the need for war materials became the greatest, our company with the assistance of the U. S. Employment Agency and the British government, was fortunate enough to obtain the services of 86 Jamaican Negroes. Of this group, 55 men were directly employed in our smelting department where the exposures prevalent were from lead fumes and lead dust in combination with oxides, sulfates, hydroxides and antimony; the most prevalent exposures being lead dust and the primary manner of absorption being through the respiratory tract, by inhalation of the dust.

It is interesting to note that all of these employees were of colored stock and in view of the generally accepted thought that the Negroes were extremely susceptible to absorption, we were most interested in keeping an unusually close watch as to their behavior and response to their exposures. Another reason for this close observation was the obligation that our company assumed towards these men (through the British government which requested this pledge) that the best available care be provided for their health and welfare. Our company fulfilled its pledge by leasing an entire small hotel directly opposite the plant where they were all comfortably accommodated; all rooms were thoroughly cleansed before their arrival—beds were all painted—bathrooms made adequate—large recreation rooms provided—soft drinks and candies made available—radios installed—religious services held weekly. Speeches and lectures were given by key men as to the types of work they were to perform, along with descriptions of the hazards to be encountered; and at the same time cleanliness and the use of masks were stressed.

Our studies covered a period of eight months, and during that period the following statistical data were accumulated with the interesting fact that not one of these men developed lead intoxication.

The tables provide the results of our studies; however, we believe that it will be more informative if we first present our classification of various degrees of absorption which we use as our guide (Brockway).

TABLE I.

Group 1	—	1-5 stippled cells in entire field
Group 2	—	6 or more stippled cells in 30 fields
Group 3	—	30 stippled cells in 30 fields
Group 4	—	60 to 120 stippled cells in 30 fields
Group 5	—	6 stippled cells in every field

Table 1 shows the various groupings of lead absorption and intoxication. As to Groups 1 and 2, the absorption is minimal and usually insignificant. However, as soon as the one reaches Group 3, there is sufficient evidence in the blood smears to indicate genuine absorption with impendings signs and symptoms depending upon the reaction of the individual to the exposure. From that point, evidence of intoxication can be expected, and the case then treated accordingly.

TABLE II.
STIPPLE-CELLS GROUPING

16 cases	— Group 1	11 Cases	— Group 3
25 cases	— Group 2	3 Cases	— Group 4

Table II indicates that all employees exposed to lead fumes or dust, absorb variable quantities and eventually demonstrate their effects in blood smears.

TABLE III.
RATE OF ABSORPTION (VIA STIPPLE-CELL COUNTS)

10 cases showed stippling on employment (1-3 cells per 30 fields)
33 cases showed stippling from 3-4 weeks (1-73 cells per 30 fields)
55 cases showed stippling from 7-8 weeks (1-96 cells per 30 fields)

Table III indicates that 16% of the entire special group employed (86) demonstrated evidence of stippling on pre-employment examinations and yet were never exposed to any lead hazard. This confirms what is universally known, that many other diseases and conditions exist which produce this stippling phenomenon other than lead.

This table likewise shows that in this special group of employees, the rate of absorption varies among individuals, just as occurs among all groups of workers.

See "Plumbophobia—Occupational lead Poisoning," by WM. C. WILENTZ, M.D., INDUSTRIAL MEDICINE, 15:4, 253-256, April, 1946.

TABLE IV.
AGE-GROUPINGS

1—19 yrs.	4—27 yrs.	3—33 yrs.
3—22 yrs.	2—28 yrs.	1—34 yrs.
3—23 yrs.	4—29 yrs.	2—35 yrs.
3—24 yrs.	4—30 yrs.	1—38 yrs.
7—25 yrs.	2—31 yrs.	1—39 yrs.
11—26 yrs.	2—32 yrs.	1—41 yrs.

Table IV shows that the average age of this group was 28 years.

TABLE V.
BLOOD VARIATION

Range of stippling	—	1 to 96 (in 10 weeks)
Range of hemoglobin	—	106 to 68% (in 17 weeks)
Range of red blood cells	—	7,300,000 to 4,050,000 (in 22 weeks)

Table V shows range of stippling, hemoglobin and red blood cell counts, and periods at which these extremes were reached.

SUMMARY: A study of 55 lead absorption cases among Negroes with no evidence of intoxication has been presented—this study covered eight months and terminated when the group returned to their native country.

Table I shows that (a) when stippling count is less than one stipple to a field, minimal absorption is present; and (b) when stipple count shows at least one stipple to a field, then one may expect evidence of intoxication unless immediate steps to therapy are inaugurated.

Table II shows that (a) most of the group were in Group 2; and (b) all employees exposed to lead fumes or dust absorb variable quantities of lead and their effects are easily demonstrated in blood smears.

Table III shows that (a) rates of absorption vary with the individual and exposure; and (b) intensity of absorption also vary with individual and exposure.

Table IV shows that average age of group under study was 28.

Table V shows that there exist marked time variations as to blood changes between stippling, hemoglobin and red blood cell counts.

CONCLUSIONS: (1) A study of 55 Negroes with various degrees of lead absorption is presented. (2) Exposure to lead dust and fumes was maximum. (3) No lost time resulted in any case. (4) No disability of temporary or permanent nature occurred. (5) No evidence of lead intoxication was found. (6) This study again shows what excellent results can be accomplished when cooperation exists between the medical department and the lay executives of a company. (7) General fear of lead exposure (plumbophobia) is again proved to be unfounded, inaccurate and unfair. An industry that is spending large amounts for the installation of modern protective equipment in addition to providing well trained physicians, technicians and modern medical dispensaries, deserves a more equitable and unprejudicial reception from the medical profession.

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ASSOCIATION NEWS

Boston Conference

THE 1948 Conference on Industrial Health held in Boston, March 27 through April 4, 1948, is now history. It was a grand and most successful meeting.

We are all interested in convention attendance so here are the official figures:

BOSTON 1948 CONVENTION ATTENDANCE

PAID REGISTRATIONS

American Association of Industrial Physicians and Surgeons	357
American Conference of Governmental Industrial Hygienists	123
American Industrial Hygiene Association	230
American Association of Industrial Nurses	554
American Association of Industrial Dentists	17
	1281
Exhibitor's Guest Paid Registration Fee	1
	1282

NON-PAID REGISTRATION

Students — Interns — Residents	18	
Foreign Guests	2	
Those Attending One Session Only	21	
Guest Speakers	28	69
		1351
Women's Reception Committee	3	
Relatives of Registrants (Wives, etc.)	68	71
		1422
Exhibitors	214	
Exhibitors' Guests	16	230
		1652

This does not include those who attended the Wednesday evening sessions, Wednesday, Thursday and Friday evening banquets and the Sunday morning nurses breakfast, who may not have registered. (Registration was not required to attend the above-mentioned functions.)

An Analysis of Registrations where the person attending was a Member of two or more of participating groups, revealed the following:

A.A.I.P.&S. and A.I.H.A.	20
A.A.I.P.&S. and A.C.G.I.H.	7
A.A.I.P.&S., A.C.G.I.H., and A.I.H.A.	9
A.C.G.I.H. and A.I.H.A.	51
A.C.G.I.H. and A.A.I.N.	14
A.C.G.I.H., A.I.H.A. and A.A.I.N.	2

The Tuesday morning clinic at the Massachusetts General Hospital filled the amphitheater to overflowing capacity with 202 signing the roll call. At the Boston City Hospital, Tuesday afternoon, this very excellent clinic was attended by 170 who signed the roll call. Again the Wednesday evening program was exceptionally well attended.

The AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS meetings were excellent and this in spite of the fact that it was necessary to hold these meetings on the Saturday preceding Easter and on Easter Sunday afternoon.

Then on Tuesday and Wednesday we began to see the familiar faces of our AMERICAN INDUSTRIAL HYGIENE ASSOCIATION friends who constituted the sizable body of 230 registrants. Their dinner Wednesday evening at the Harvard School of Public Health and the following evening sessions were real opportunities to continue fellowship and informative discussion periods.

The AMERICAN ASSOCIATION OF INDUSTRIAL DENTISTS had some very fine sessions and joined the enthusiastic crowd at the Thursday evening banquet. We did miss some of the old reliables such as DR. ERNEST GOLDHORN.

Wednesday morning we saw a few of our AMERICAN ASSOCIATION OF INDUSTRIAL NURSE friends, and a goodly number showed up on Thursday. Then on Friday these nurses really came out *en masse* with a total registration of 554 for the conference. We were fortunate to have meeting room space available for them. Of course their Friday evening banquet, filled to capacity with some 650 dinner guests, was really one of the outstanding highlights of the Conference. But in spite of the late activities of Friday night these nurses were on the job at their Saturday morning business session. Their Sunday morning breakfast with 365 was a grand finale to the entire conference.

As is always true in attending these conferences there are many inspiring experiences outside of the scheduled papers and presentations. We meet our old friends and we make new friends. Conversation constantly reverts to our professional experiences and exchange of technique in the handling of our problems. Of course, the Boston trip gave most of us an opportunity to enjoy our fill of sea food —the wonderful lobster and sea food dinners are now memories.

We are much indebted to our New England friends for having arranged such a worth while conference, to have provided the ladies and guests with abundant entertainment and tours to so many historic places, and to have shown us real New England hospitality. We love Boston and especially our friends, the people of Boston.

It was most heartening to officers and directors of AAIP&S to note the splendid attendance at the annual meeting Thursday afternoon. It lasted about an hour with the Treasurer's report, the Managing Director's report, Secretary's report, and the report of the activities of the Board of Directors.

The enthusiasm for the projects being sponsored by this Association is most encouraging. The following officers and directors were elected:

President: HAROLD A. VONACHEN, M.D., Caterpillar Tractor Company, Peoria, Illinois.

President-Elect: ALFRED H. WHITTAKER, M.D., Consultant in Industrial Surgery, 1427 E. Jefferson St, Detroit, Michigan.

1st Vice-Pres.: EDWARD H. CARLETON, M.D., Inland Steel Company, East Chicago, Indiana.

2nd Vice-Pres.: ADOLPH G. KAMMER, M.D., Carbide & Carbon Chemicals Corp., So. Charleston 3, West Virginia.

Secretary: FREDERICK W. SLOBE, M.D., 2024 So. Western Ave., Chicago 8, Illinois.

Treasurer and Managing Director: EDWARD C. HOLMBLAD, M.D., 28 E. Jackson Blvd., Chicago 4, Illinois.

Directors 1947-1949:

LOUIS R. DANIELS, M.D., Hood Rubber Co., Watertown, Massachusetts.

A. J. FLEMING, M.D., Haskell Laboratory of Industrial Toxicology, Wilmington, Delaware.

ROBERT M. GRAHAM, M.D., The Pullman Company, 222 No. Bank Drive, Chicago.

L. E. HAMLIN, M.D., American Brake Shoe Co., 2501 Blue Island Ave., Chicago 8, Illinois.

E. A. IRVIN, M.D., Cadillac Motors Division, General Motors Corporation, Detroit 32, Michigan.

F. E. POOLE, M.D., Lockheed Aircraft Corp., Rexall

Drug Company, 702 West Broadway, Glendale 4, California.

Directors 1948-1950:

J. M. CARLISLE, M.D., Merck & Co., Inc., Rahway, New Jersey.

HAROLD M. HARRISON, M.D., Geo. Weston Lt'd., 302 Bay Street, Toronto 9, Ont., Canada.

EDWARD P. HELLER, M.D., Kansas City Industries, Kansas City, Missouri.

EARL F. LUTZ, M.D., General Motors Corp., Detroit, Michigan.

ROBERT COLLIER PAGE, M.D., Standard Oil Company of New Jersey, 30 Rockefeller Plaza, New York.

GEORGE F. WILKINS, M.D., New England Tel. & Tel. Co., Boston, Massachusetts.

New England Conference

THE program for the NEW ENGLAND CONFERENCE OF INDUSTRIAL PHYSICIANS AND SURGEONS is as follows:

Spring Meeting: Hotel Bond, Hartford, Connecticut, May 27, 1948.

Sponsor: Industrial Health Committee, Connecticut State Medical Society; Guest Sponsors: (1) Industrial Health Committee, Manufacturers Association of Connecticut; (2) Industrial Nursing Section, Connecticut State Nurses' Association; (3) The Connecticut Safety Society.

MORNING SESSION

PRESIDING: (1) J. ROBERTSON KNOWLES, M.D., President, NEW ENGLAND CONFERENCE OF INDUSTRIAL PHYSICIANS AND SURGEONS; (2) C. FREDERICK YEAGER, M.D., Chairman, Industrial Health Committee, Connecticut State Medical Society.

"Industry's Interests in Health and Safety Services"—Speaker to be supplied by Industrial Health Committee, Manufacturers Association of Connecticut.

"The Medical Profession's Interest in Industrial Health and Safety Services"—President, Connecticut State Medical Society.

"Newer Opportunities and Responsibilities in Industrial Health and Safety Services"—DANIEL L. LYNCH, M.D., NEW ENGLAND CONFERENCE OF INDUSTRIAL PHYSICIANS AND SURGEONS.

AFTERNOON SESSION

PRESIDING: (1) DONALD J. BAKER, M.D., Vice-President, NEW ENGLAND CONFERENCE OF INDUSTRIAL PHYSICIANS AND SURGEONS; (2) ELWOOD WEISE, M.D., Secretary, Industrial Health Committee, Connecticut State Medical Society.

PANEL DISCUSSION: "Coordination of Medical, Nursing and Safety Services in Industry"—Viewpoint of: (1) Industry—Speaker to be supplied by Industrial Health Committee, Manufacturers Association of Connecticut. (2) Industrial Nursing—Speaker to be supplied by Industrial Nursing Section, Connecticut State Nurses' Association. (3) Safety—Speaker to be supplied by Connecticut Safety Society. (4) Industrial Medicine—Speaker to be supplied by NEW ENGLAND CONFERENCE OF INDUSTRIAL PHYSICIANS AND SURGEONS.

Discussion—Leader to be supplied by Industrial Health Committee, Connecticut State Medical Society.

"Training of Industrial Physicians and Nurses"—RONALD F. BUCHAN, M.D., Clinical Director, Yale Institute of Occupational Medicine and Hygiene.

"Trends in Health Services in Small Industries"—R. L. QUIMBY, M.D., Hartford.

Discussion—Led by STANLEY SPRAGUE, M.D., NEW ENGLAND CONFERENCE OF INDUSTRIAL PHYSICIANS AND SURGEONS.

DINNER MEETING

MASTER of Ceremonies: CREIGHTON BARKER, M.D., Executive Secretary, Connecticut State Medical Society.

Presiding: J. ROBERTSON KNOWLES, M.D.,; C. FREDERICK YEAGER, M.D.

Address: "How Industry Looks to and at Its Health and Safety Services"—An industrialist representing Connecticut Manufacturers Association or another state group.

Western Association

THE WESTERN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS held a very successful meeting in San Francisco, April 10 and 11 preceding the California Medical Association meeting in San Francisco. Newly elected officers and directors are:

President: JEROME SHILLING, M.D., 740 So. Olive St., Los Angeles 14, California.

Vice-President: JOHN R. ERWIN, M.D., Medical Director, Boeing Aircraft Corp., Seattle 14, Washington.

Secretary: CHRISTOPHER LEGGO, M.D., Medical Director, California & Hawaiian Sugar Refining Corp., Ltd., Crockett, California.

Treasurer: JOHN E. KIRKPATRICK, M.D., 516 Sutter St., San Francisco, California.

Directors: E. P. LUONGO, M.D.—1949, 1757 No. Stanley Ave., Hollywood, 46, California; LOUIS D. CHENEY, M.D.—1950, P. O. Box 3339, Terminal Annex, Los Angeles, 54, California; RODNEY R. BEARD, M.D.—1951, Pan American Airways, P. O. Box 3689, San Francisco, 19, California; FENN E. POOLE, M.D.—1952, 702 W. Broadway, Glendale 4, California.

Chairman, Board of Directors: WILLIAM P. SHEPARD, M.D., 600 Stockton Street, San Francisco, California.

Michigan Association

THE MICHIGAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS held a splendid meeting in Lansing, Michigan, March 3, 1948. The following officers and directors were elected:

President: E. A. IRVIN, M.D., Cadillac Division, General Motors Corp., 2660 Clark Avenue, Detroit 32, Michigan.

President-Elect: K. E. MARKUSON, M.D., 532 Division Street, East Lansing, Michigan.

Sec.-Treas.: JOSEPH L. ZEMENS, M.D., Packard Motor Car Co., 1580 E. Grand Blvd., Detroit 32, Michigan.

Central States Society

THE following is the program of the CENTRAL STATES SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY held jointly with CHICAGO SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY on Sunday, May 9, 1948:

SCIENTIFIC PROGRAM: ROBERT M. GRAHAM, M.D., President, CENTRAL STATES SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY; DWIGHT I. GEARHEART, M.D., President, CHICAGO SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY.

Program Committeemen: JAMES J. CALLAHAN, M.D., CARLO SCUDERI, M.D., BRYCE B. REEVE, M.D., H. GLENN GARDINER, M.D.

"Differential Diagnosis of Painful Shoulders"—CARLO SCUDERI, M.D., Chicago, Associate Professor of Surgery, University of Illinois College of Medicine; Attending Surgeon, Cook County Hospital; Senior Orthopedic Surgeon, St. Elizabeth's Hospital.

"Medical-Legal Aspects of Coronary Disease"—SAMUEL G. PLICE, M.D., Chicago, Professor of Clinical Medicine, Loyola University, School of Medicine.

"Differential Diagnosis of the Pneumoconioses"—OSCAR A. SANDER, M.D., Milwaukee, Member Medical Committee, Industrial Hygiene Foundation of America; Member Committee on Tuberculosis in Industry; American Trudeau Society.

"Treatment of Industrial Chest Conditions"—HAROLD E. DAVIS, M.D., Chicago, Associate on Faculty, Northwestern University Medical School.

"Chest Conditions in Industry from the Standpoint of the Medical Director"—L. E. HAMLIN, M.D., Chicago, Medical Director, American Brake Shoe Company.

General Membership Business Session, CENTRAL STATES SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY: Report of Nominating Committee; Election of Officers and Board of Governors for the ensuing year.

General Membership Business Session, CHICAGO SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY: Report of Nominating Committee, Election of Officers and Board of Governors for the ensuing year.

DR. R. L. LAMY, of Granby, Quebec, Canada, received a very fine letter complimenting him on his program for the prevention of accidents with the British Silk Mills, Ltd. For the past three years there has not been a single lost time injury and they have been awarded the Safety Competition Trophy each of these three years.

WE HAVE received several inquiries from our fellows and members regarding their omission from the book entitled WHO'S WHO IN INDUSTRIAL MEDICINE.

WHO'S WHO IN INDUSTRIAL MEDICINE is not an Association project and it, therefore, does not contain the names of all of the members and fellows of this Association. There are some missing, most of whom failed to send in the questionnaires sent out by the publisher. Also there are men listed in WHO'S WHO IN INDUSTRIAL MEDICINE who are not members of this Association.

There is being prepared, and we hope to have published within the next 60 days, an Association Directory. This will include all the names of fellows, members and associate members of this association and all its component societies' members. There will be an alphabetical listing and a complete geographical listing, with description of the members medical training, industrial appointments and teaching institution affiliations in accordance with the information which has been sent to us. The directory will be distributed to all of the members of the Association without charge. There will be new issues of this directory from time to time, as it is deemed desirable and necessary to keep the membership informed.

DR. LEIGH A. SIMPSON, Medical Director of Peter Kailler Kohler Swiss Chocolate Co., Inc., Fulton, New York, died very suddenly on March 26, 1948. DR. SIMPSON was graduated at the Syracuse Medical College in 1920 and was on the staff of the Lee Memorial Hospital in Fulton, New York. He was 53 years of age and a member of AAIP&S for many years.

WE ARE advised by the Florida Association of the recent passing of DR. R. D. FERGUSON, of Ocala, Florida.

WE JUST received notice of the death of DR. LEE D. DARNER, 2561 Cleveland Blvd., Granite City, Illinois, on September 15, 1947. He was a graduate of the Washington University School of Medicine, St. Louis, 1913, Fellow of the American College of Surgeons, and a fellow of the AAIP&S for many years. He died at 59 years of age of chronic myocarditis.

THE WESTERN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS advises us of the deaths of two of its members, DR. GEORGE D. WELLS, 4317 Downey Road, Los Angeles, California, and DR. C. E. ROONEY, 300 Ocean Park Boulevard, Santa Monica, California, where the latter was Medical Director at Douglas Aircraft Co.

WE ARE advised of the death of DR. ROBERT ALFRED HEARN, a graduate in 1920 of Columbia University College of Physicians and Surgeons, and formerly with U.S.P.H.S. as director of Industrial Hygiene, State Board of Health of Arkansas, and who served as Medical Director of the Indiana Division of the Republic Aviation Corporation in Evansville. He died September 1, 1947, at the age of 56 of tuberculosis.

COMMENT and OPINION

Unhealthy Jobs

THE board of review of the New Jersey Unemployment Compensation Commission has ruled against requiring jobless persons to accept employment injurious to their health. It upheld the claim of a Newark woman who refused to return to work in which she had contracted eczema.

—*New York Times*, April 11, 1948.

Controlling Population

THE DAY of enlightened governments and well-behaved human beings will not come until the size of population is controlled, says Dr. Ernest A. Hooten, Harvard University anthropologist. "Too many persons and too little food create a situation which strips men of their tenderness and acquired good behavior." Dr. Hooton said human overbreeding was due mainly to "uncontrolled sexuality and ignorance of contraception." —*News Item*

Example

IN A PAPER before the Southern Medical Association on industrial health as a special field of medical interest, Dr. Stanley J. Seeger of Dallas, Texas, referred to the 1946 agreement between the UMW and the government for a health and medical fund for workers, stating that the final determination of the health and welfare plan promulgated by the United Mine Workers of America is certain to have a "profound effect" upon the nation's industrial health picture.

Blots on Personality

THE "ink blot" method of psychological testing is being used in industry now to find the "right people for the right jobs." This test is used "to reveal personality structure by telling what you see in an ink blot, what associations are aroused and your organization of these associations. They reveal the unique combination of emotional and intellectual factors which comprise the personality structure." People who carry leaky fountain pens are not allowed to enter the contest, and the decision of the judges is final. —*Detroit Medical News*, April 19, 1948.

Chicago Society

CHICAGO SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY, at its Mid-Winter Session, at the Palmer House, at 8:30 p.m., Monday, February 9, 1948, featured "Backaches from an Industrial Standpoint." The program, arranged by DR. CARLO SCUDERI, included "Orthopedic Aspect," by FREMONT CHANDLER, M.D., F.A.C.S., Professor, Orthopedic Surgery, University of Illinois; "Neurosurgical Aspect," by ERIC OLDBERG, M.D., F.A.C.S., Professor and Head of Department of Neurology and Neurological Surgery, University of Illinois; and "Neuropsychiatric Aspect," by BEN W. LICHTENSTEIN, M.D., Attending Neurologist, Cook County Hospital; with discussion by EDWIN W. RYERSON, M.D., F.A.C.S.

New York University—Bellevue Medical Center

DR. ROBERT COLLIER PAGE, general medical director of Standard Oil Company of New Jersey, said regarding the gift of $250,000 from his company to the New York University-Bellevue Medical Center fund that it was to be divided into $100,000 for construction and initial equipment of laboratories in the Institute of Industrial Medicine; $50,000 for clinical facilities in the university hospital; $50,000 in support of the general program, and $50,000 for the support of original research relating to the petroleum industry. DR. PAGE stressed the importance and "economic significance" of business and industrial support of private educational institutions that "can bring a greater variety of viewpoints to bear on problems of medicine in industry. The Standard Oil Company of New Jersey has long been active in the field of medicine in industry and has developed an extensive medical program for employees. The program takes into consideration not only the means for medical care which are available to employees when ill, but also study and practice measures which can prevent sickness or injury and can build improved health." Asserting that employee health was closely related to the ability of an enterprise to produce economically, DR. PAGE said Standard of New Jersey "followed with lively interest" the plans of the New York University College of Medicine and Bellevue Hospital for construction of a "great new medical center."

New York State Will Study Industrial Cancer

A GRANT of $32,694 for a study on industrial cancer control, which is planned by the Industrial Cancer Committee of the New York Department of Labor, was voted on March 11 by the National Advisory Cancer Council. The survey will seek to determine what the potential and actual relationships are between cancer and occupation as a result of exposures to chemicals and physical agents. This first large-scope scientific study of industrial cancer control will be conducted at the Roswell Park Memorial Institute, Buffalo. Five thousand male cancer patients will be interviewed. Results will be checked by interviewing 1,000 male non-cancer patients at Roswell Park over a period of two years. Men will be used exclusively in the study because of the generally longer continuity of their work histories in an occupation. An article by DR. W. C. HUEPER, of New York, an environmental cancer consultant to the Public Health Service, was quoted today by the service as authoritative on this subject. He said that while a few cancers of occupational origin existed before the modern industrial era, the great majority of them appeared as a result of it. DR. HUEPER has drawn up a list of 14 recommendations for the control of occupational cancer, covering building construction, the packing of hazardous chemicals, protective clothing for workers, medical supervision, government inspection and compensation laws.

—*New York Times*, March 11, 1948, in *Industrial Hygiene Digest*, March.

Medical Relations in Business and Industry

CONFERENCE on Medical Relations in Business and Industry" is the title of a Wednesday series of programs offered by the Wayne University School of Occupational Health April 28 to June 16 in the Rackham Memorial and Maccabees building in Detroit. Authorities in the field from nine different states will be featured speakers and instructors. According to DR. RAYMOND HUSSEY, dean of the School, the Conferences, which are fifth in a series

of similar presentations, are designed especially for physicians, engineers, chemists, personnel-relations and industrial-relations directors, and plant nursing staffs. Emphasis will be upon the overlapping interests and responsibilities of these various groups in developing and operating a complete employee health service in business and industry. Opening speaker, on the afternoon of Wednesday, April 28, will be DR. THEODORE M. NEWCOMB, professor of psychology at the University of Michigan, who will speak on "The Meaning of Human Relations in Industry." Programs for the other individual conferences will be announced later, Speakers coming from other states to appear on various programs during the series are: DR. HAROLD A. VONACHEN, medical director, Caterpillar Tractor Company, Peoria, Illinois; DR. ROSS A. MCFARLAND, Harvard University, Cambridge, Massachusetts; DR. JAN H. TILLISCH, Mayo Clinic, Rochester, Minnesota; DR. THEODORE F. HATCH, director of research, Industrial Hygiene Foundation, Pittsburgh; DR. WILLIAM P. YANT, vice-president in charge of research, Mine Safety Appliance Company, also in Pittsburgh. Also listed among the speakers are: R. V. BROWN, chairman, Society of Automotive Engineers' Committee on Riding-Comfort Research, Akron, Ohio; DR. CLIFFORD T. MORGAN, professor of psychology, Johns Hopkins University, Baltimore; DR. DANIEL L. LYNCH, medical director, New England Bell Telephone Company, Boston; DR. WILLIAM D. STROUD, professor of cardiology, University of Pennsylvania, Philadelphia; DR. RUFUS B. CRAIN, assistant medical director, Eastman Kodak Company, Rochester, New York; and DR. RUTHERFORD T. JOHNSTONE, consultant in occupational health and diseases, Los Angeles. Each Wednesday program will begin at 4:30 P.M. The group will recess for dinner at 6:00 and reconvene for a discussion period at 7:15 P.M.

Health of Arc Welders

HEALTH of Arc Welders in Steel Ship Construction," Public Health Bulletin No. 298, just released by the U. S. Public Health Service, reports a study of the health of shipyard welders which was made by the Industrial Hygiene Division, U. S. Public Health Service in cooperation with the U. S. Maritime Commission and the U. S. Navy in Maritime Commission and Navy-contract shipyards. The study was initiated in 1943 because of increasing complaints of respiratory illness from shipyard workers. Although it did not reveal any major health hazards, the findings will be of great assistance to physicians, engineers and compensation authorities. Both environmental and medical surveys were included. During the environmental survey, analyses were made of the fume and gases contaminating the air of work places in seven Atlantic, Pacific and Gulf Coast shipyards. Some 1,767 samples of iron and total fume were taken, 278 samples for zinc, 25 for lead, and 2,019 for the oxides of nitrogen. In general, the concentrations of welding fume and gas observed were relatively low. Some type of control ventilation was available at all yards studied. Although the ventilation was of varying effectiveness, extreme degrees of atmospheric contamination were infrequent. During the medical survey, 4,650 persons (2,950 men and 1,700 women) were examined. Some 70% of these were shipyard arc welders who were working with coated electrodes on bare or galvanized steel; about 21% are non-welders who were included in the study for control purposes; and 9% could not be included in either group because of past exposure. Only a few significant clinical symptoms which might be related to occupational exposures were observed among the workers examined. Among these were a respiratory symptom complex, arc welder's siderosis, lowered blood pressure, and welding burns. Detailed studies failed to reveal any marked blood abnormalities among welders. There was no indication that welding fume, under conditions observed, predisposed workers to pulmonary tuberculosis. Gastrointestinal symptoms were infrequent. The upper respiratory symptom complex noted occurred slightly more frequently among welders than non-welders. Symptoms included pharyngitis, rhinitis, sinusitis and sometimes tracheobronchitis. These were usually mild and non-disabling and were productive of signs and symptoms indistinguishable in most respects from upper respiratory affections induced by allergic or other irritant toxic agents or by infections. Observations failed to reveal that welding fume irritated all welders, but suggested that the inflammations noted arose from infectious foci and other sources, and might have been aggravated by exposure to welding fume. Arc welder's siderosis was diagnosed in only 61, or 3%, of the male welders and 10, or 3%, of the males who had mixed exposures. Inasmuch as iron oxide is the principal component of welding fume, it may seem surprising that so few welders showed this condition. Since slightly lower blood pressure was observed among welders than among non-welders it seems that factors associated with welding depress the blood pressure. The difference between welders and non-welders was too small to make a clinical impression on the examining physician at the time of the individual examinations. Hence no clinical laboratory tests were made to establish or identify the depressor or antipressor agents. Welding burns or scars are intimately related to arc-welding operations. These lesions are only rarely disabling and usually can be prevented by adequate safety practices. Copies of "Health of Arc Welders in Steel Ship Construction," Public Health Bulletin No. 298, by Waldemar C. Dreessen, Senior Surgeon; Hugh P. Brinton, Statistician; Robert K. Keenan, Senior Assistant Scientist (R); Thalbert H. Thomas, Sanitary Engineer (R); and Edwin H. Place, Surgeon (R) of the U. S. Public Health Service; and James E. Fuller, Lt. Comdr. H. (S) USNR, Regional Health Consultant, U. S. Maritime Commission, may be obtained from the U. S. Public Health Service, Washington 25, D.C. Additional copies may be purchased from The Superintendent of Documents, Government Printing Office, Washington 25, D. C.

EDITORIAL

Light Work

THE TERM, *light work* as commonly used in designating the disposition of the industrially disabled might well be abandoned to a large degree. It is ambiguous and relative; consequently, its use leads to confusion and misinterpretation. In any given instance, the physician, employee, employer, or insurance company may construe its meaning quite differently.

The modern and all important *fourth* phase of treatment—namely, rehabilitation and return of the employee to productiveness—is conditioned upon an early return to functional activity and the best site for such activity is the employee's place of employment. All treatment, from its very inception, is directed toward that goal. And the sooner it is done, the better; the longer it is delayed, the more likely the development of an unfavorable attitude, neurosis, or compensation complex and that retardation of recovery which is always concurrent with lack of physical and mental activity.

The convalescing employee, then should be sent to *work*. Through close cooperation between the physician, employer, and employee, there should be a definite understanding as to the nature of the work to be performed. That work is selected which is optimal for the employee in his existing state and its specifications should be changed as his condition improves. The work selected should utilize whichever capabilities exist. This may mean modifying or changing the job, that is, fitting the job to the man. Wherever possible, the employee should have demonstrated to his own satisfaction that he can do such tasks as he will be expected to perform by engaging in similar activity during treatment; the employer, likewise, should appreciate that his full cooperation is essential. It is obvious that this concept of returning to specified, supervised work is quite different from the ambiguous term, *light work*.

Several barriers to the successful development of such a program are frequently encountered. Some employers are loathe to cooperate. They may grumble about supervising such *special* work or state that they prefer that the employee remain at home until he is fully able to do his regular work. It requires education to convince some employers that such an attitude increases compensation payments in the aggregate, together with the other attendent costs of increased absenteeism, and the higher awards at the industrial commission, without considering the more intangible factors related to morale, employee relationship, and productivity.

Some labor unions, likewise, constitute a barrier because of strict instances on wage differentials, seniority rights, and refusal to accept changes in job classification. By strict adherence to such inelastic rules when one of their member's rehabilitation is at stake, some unions do their members a disservice instead of serving them. Instead of focusing the attention of their members on the legal aspects or a possible award by the industrial commission (since the basis for settlement does not terminate until many months after the employee returns to work) the counsellors would render far greater service by prevailing upon both employer and employee toward developing a suitable work program for those ready to return to some type of work.

Some employees, too, are resistant about returning to work before their "case is settled." They think they may lose their "rights" if they return to work. Obviously, such unsound attitudes stem from ignorance and can only be banished by frank discussion and explanation. They are more prone to develop in plants where cooperation by management has been lacking. Unscrupulous lawyers occasionally are at the root of the employee's refusal to return to work or failure to cooperate during treatment; the employee may be following his lawyer's instructions. When such instances are discovered the industrial commission should be notified and the local Bar Association as well.

Nor are the physicians always blameless. Too often is treatment conducted with little thought about early functional activation in the employee's work environment. Little effort may be made to intervene with the plant superintendent about arranging suitable work and in changing it as the employee's ability improves; or in developing a sound attitude in the employee and in pointing all therapy toward early, active use of those parts of his anatomy not affected by the injury.

All that has been said here is equally applicable to those partially disabled by disease, though here we have the additional barrier of the possibility of aggravation by a work factor with subsequent liability under existing compensation laws. Changes in the compensation laws and broadened second injury funds should be developed lest an altruistic employer be unjustly penalized.

Thus, it is seen that the loosely used term, *light work* yields to the broader concept of returning to *work*—work, it is true, that may be restricted in many ways, that may be specific for a given individual, that may be limited to the utilization of what the employee "has left"—so that one of the most important phases of treatment may be utilized, namely, early functional activation in the employee's work environment.

—FREDERICK W. SLOBE, M.D.

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INDUSTRIAL HEALTH and DISEASE

Summary of Saranac Symposium on the Beryllium Problem

O. A. SANDER, M.D.,
Vice-Chairman, Medical Committee,
Industrial Hygiene Foundation

THIS symposium was held at the Saranac Laboratory for the Study of Chest Diseases, at Saranac Lake, New York, during the week of September 29, 1947. Its purpose was to bring together all available data on the health hazards resulting from exposure to the beryllium compounds.

Nomenclature

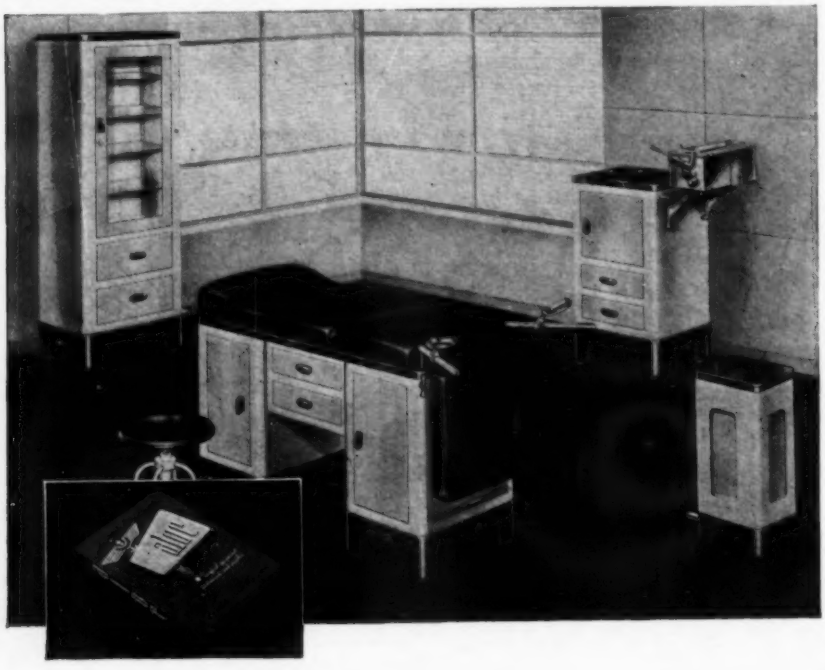
THE acute phase was officially named *acute pneumonitis of beryllium workers* by a committee on nomenclature, indicating that the reaction is largely pulmonary and acute. It is characterized by acute irritation of the upper respiratory tract, including pharynx, trachea, and bronchi with occasional cases of acute pulmonary edema. Dermatitis and conjunctivitis also may result from such exposures.

The chronic phase was named *pulmonary granulomatosis of beryllium workers* because the unit lesion is a chronic granuloma composed of proliferating cells with widely scattered multinucleated giant cells occurring in the lungs. Because of associated thickening of the walls of the air spaces, interference with exchange of gases occurs with a resulting marked shortness of breath on exertion and occasional deaths from right heart failure (known as "cor pulmonale").

Acute Pneumonitis

THE ACUTE reactions have been seen only in the beryllium extraction plants where the exposure is largely due to the acid compounds of beryllium, the sulfates, and the fluorides. No reactions have been seen from contact with the metal itself. Three deaths from lung edema were seen in one plant in the Cleveland district between 1939 and 1943. Few cases and no deaths have been seen. Those so afflicted had complete clearing of the lungs and none had developed the pulmonary granulomatosis seen with exposure to other compounds.

All acute pneumonitis cases had exposure either to beryllium sulfate or beryllium fluoride and no acute cases have been seen which did not have exposure to one or the other



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acid compound, or both. This fact has led some authorities to believe that beryllium should not be implicated in these acute cases because the fluorides and sulfates of many metals are similarly toxic. L. T. FAIRHALL, chief toxicologist of the U. S. Public Health Service, still considers beryllium, *per se*, non-toxic and believes that when its compounds are irritants, the beryllium radical should not be implicated. Because of this lack of absolute proof, the nomenclature committee chose to say *of beryllium workers* rather than *beryllium pneumonitis.*

Pulmonary Granulomatosis

THE X-RAY appearance of this granulomatosis, usually characterized by small discrete stippling, is so like the appearance of many cases of sarcoidosis that all the early cases were so diagnosed. Moreover, the microscopic appearance of the granuloma is quite similar to the sarcoid lesion. However, sarcoid-like lesions of bones are absent in the beryllium variety. Spontaneous remissions with disappearance of the x-ray shadows have not occurred with the latter as with typical sarcoid.* Most of the cases have progressed considerably, long after exposure stopped.

Another characteristic of this chronic condition is its delayed onset, occurring in some cases as long as five years after termination of the exposure. In the long interval before the onset, there were no warning symptoms of what was going to occur. Another feature of the granuloma cases is the low attack rate—less than 2% of those exposed developed the lung changes. This fact has led to the belief that an X factor is necessary as a trigger mechanism. Also, none of the cases so far observed have had or developed any active tuberculosis.

These chronic granulomatous cases have occurred in three industries so far and are listed here in chronological order:

1. FLUORESCENT LAMP MANUFACTURING: This industry has produced approximately 50 cases, a number of which have died. The principal exposure was to fluorescent powders containing zinc-beryllium silicate. Whether or not this compound is the offending agent cannot be stated, however, because the unit lesion has not been reproduced in animals by the compound. Complete postmortem studies on five or six cases, however, have shown the typical unit lesion, the granuloma, plus thickened interalveolar walls and cor pulmonale.

*Since the Symposium, one observer has found evidence of spontaneous diminution of the stippling on the chest films of two typical cases. It is too early to state whether such remissions will continue or remain permanent.

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2. BERYLLIUM-COPPER ALLOY: The casting of beryllium-copper alloy in one plant resulted in six cases of typical pulmonary granulomatosis, four of which died of right heart failure (cor pulmonale). They saw no acute pneumonitis, however, and no dermatitis or tracheo-bronchitis. The exposure there, was to beryllium oxide only and no acid compounds. The attack rate was less than 2%. A foreman who was the oldest employee in a casting shop with longest exposure to beryllium-copper alloy fumes has a clear chest. Radioactivity was first suspected, but none of these materials have radioactive properties.

In the past these alloys contained up to 5% beryllium. Present alloys contains not over 0.4% beryllium. Most of the beryllium gets into dross in melting, so air concentration may be higher than concentration of beryllium in the alloy (up to 1.6% in furnace pit). So far no trouble has been noted with the lower beryllium alloys, but it is too early to state that they will not cause lung changes in susceptible persons. Some stainless steels contain up to 0.7% beryllium and may be potential sources of trouble. The welding of any of these alloys should be rigidly controlled until more is known about them. Numerous other plants using beryllium-copper alloy have not had any cases, most likely because the alloy used had a lower beryllium content.

3. SIGN TUBE SHOPS: Seven or eight typical cases have come to light in sign tube benders, likely due to the same zinc-beryllium silicate exposure. The fluorescent powders have been baked onto the inner surface of glass tubing since 1939.

There are several processes which cause some of the dry powder to be thrown into the atmosphere, particularly in mixing the powders containing beryllium. The first case came to light less than two years ago. This case now has advanced right heart failure and thorough postmortem studies are planned. Another case has less shortness of breath than a year ago, but there has not been any diminution of the stippled shadows on the x-ray.

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Animal Experimentation

MUCH ANIMAL work is under way at several locations: (1) Rochester (N. Y.) Medical School, under the direction of the Atomic Energy Commission, a large user of beryllium, (2) Saranac Laboratory, and (3) Kettering Laboratory in Cincinnati. Progress reports were given, but nothing conclusive has resulted from this work so far. The four chief routes of administration are being studies — ingestion, intraperitoneal injection, intratracheal instillation. and inhalation. Numerous compounds of beryllium are being used.

The transition from acute irritation to the chronic unit lesion, the granuloma, has not been observed, but the Saranac Laboratory believes it has some evidence tending to support such transition. Much work remains to be done be-

fore anything definite will result from these studies.

Threshold Limits

A PLEA was made that attempts to set a theshold limit should not be made until much more is known about these materials.

Future Uses of Beryllium

ITS greatest increased use undoubtedly will be alloys of copper and various other metals as a hardener. It gives increased strength to the metal and probably will be used more and more with stainless steel, lead, and silver.

[*"Proceedings of the Symposium"* will be published by the Trudeau Foundation as a memorial to DR. LEROY GARDNER. It is anticipated that the publication date will be about April, 1948. Copies can be ordered by communicating with the Saranac Laboratory, Saranac Lake, New York.]

Industrial Medical Fees

HEARTENING news for the medical profession came out of the Industrial Accident Commission of the State of California last month, when the Commission approved a surgical fee in excess of the minimum fee set forth in the official schedule. If this action may be considered a test case, the medical profession may confidently expect fair and impartial consideration by this important state body. In the case recently decided, a surgeon was called upon, just as he was leaving a hospital, to examine an injured patient who had just been brought in. The patient was a workman who had fallen from a scaffold and was in a dangerous condition. The surgeon ordered a blood transfusion, called for two other specialists, a surgeon and a urologist, and did an exploratory laparotomy. When he located the injury in a kidney, he performed a nephrectomy via transperitoneal approach, followed up with more transfusions, and complete recovery resulted. Here was a definite life-saving procedure, performed in emergency circumstances and resulting in a splendid recovery. When the surgeon rendered his statement to the insurance carrier he was tendered the minimum fee for nephrectomy, plus the attendant charges. He protested the small fee allowed, particularly in view of the difficulties and time consumed in the operation, only to be met with the statement that the fee schedule adopted by the Industrial Accident Commission set forth that particular fee for that particular procedure. On the advice of the California Medical Association and with its cooperation, the doctor filed a claim for the fee he had requested. A hearing was held by a referee and the Industrial Accident Commission granted the doctor the fee he had asked. One of the startling aspects of this case was the claim of the medical director of the insurance carrier that the California Medical Association had been instrumental in drawing up the existing industrial fee schedule and that the fee for a nephrectomy was clearly set forth. This medical director deliberately by-passed the fact that the present fee schedule lists all

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fees as minimum and provides that higher fees shall be warranted where unusual difficulties or time factors are involved. Further, he contended that the doctor had no complaint because he had received the case of an unknown patient in an emergency. To top it all off, when told that the life-saving nature of the case had probably saved the insurance carrier a $6,000 death benefit, he stated that this was a problem for the claims department of the carrier and not the medical department. The overall picture of an injured workman, the potential loss of life and of money, and the duty of the insurance carrier to its beneficiaries and physicians alike, was left out of consideration. In holding an impartial hearing in this case and in granting the physician's request for a fee higher than the minimum, the Industrial Accident Commission has recognized that a minimum fee does not necessarily represent a maximum. The Commission has also served notice on insurance carriers that the rights of physicians are to be protected under the structure of the laws governing industrial accidents. Likewise, it has in effect notified all employed persons in California that the best in medical and surgical care is available to employees injured during the course of their employment, regardless of the cost of such care. The California Medical Association worked for more than four years, often against tremendous odds, to secure the adoption of a more complete, more up to date, schedule of industrial fees by the Industrial Accident Commission. The Association has offered its services to its members who are subjected to chiseling tactics by employers or insurance carriers, and it has been able to effect payment of proper fees in various cases where deductions had been made by the employer or his agent. In reaching its recent decision, the Industrial Accident Commission has proved that it looks beyond the monetary interest of the insurance carrier and into the overall benefit of the injured workman and those who care for him. This is the spirit of the industrial compensation laws of the state and the medical profession may take cheer from the existence of a Commission with a firm conviction of its own obligations and authority and the courage of its convictions.

—*California Medicine*, 68:4, 309, April, 1948.

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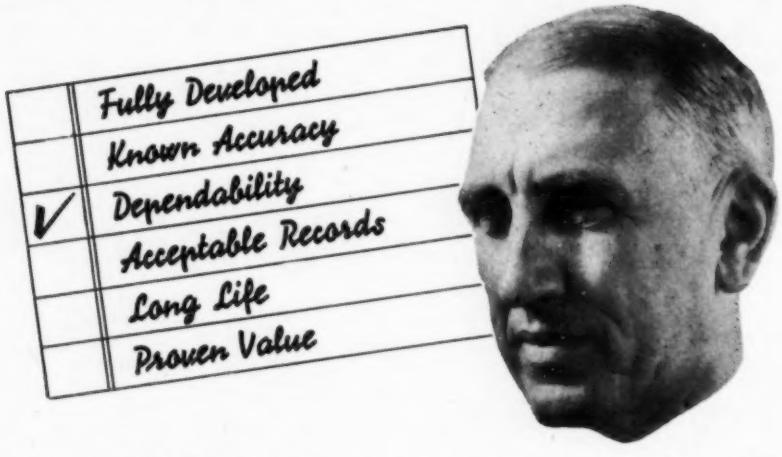

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Rigged Meeting

DISCLOSURE was made today that social workers within the U. S. Public Health Service already have written half the report on industrial health which the national health assembly

now in session here (Washington) was supposed to draft as part of its deliberations on an ideal 10-year health program. The program was requested by President Truman. The assembly, attended by 700 delegates from all parts of the United States, was convened by Oscar R. Ewing, Federal security administrator, to serve as a civilian guidance agency in implementing the President's mandate. Growing suspicions that the meeting had been "rigged," and that Mr. Truman intends to get the kind of health plan he wants without help from the assembly were voiced by a mounting list of physicians who are participating in the meeting's 14 panel discussions. The sessions are to continue through Tuesday. They said they based this belief on revelations made by DR. CARL M. PETERSON, Chicago, secretary of the Council on Industrial Health of the American Medical Association. DR. PETERSON reported that when he informed USPHS representatives that the panel on industrial health had been stricken from the overcrowded agenda of the assembly one of them replied "that is too bad because we already have the report half written." As the result of this disclosure, DR. GEORGE F. LULL, secretary and general manager of the A.M.A. and a member of the assembly's 40-man executive committee, said he would insist that the executive committee submit a "minority report." Such a report will be issued in the event it can be substantiated that Ewing already has his own 10-year health plan, or intends to disregard the recommendations for such a program formulated by the assembly, DR. LULL asserted. Press agents for the assembly, which is a privately incorporated institution functioning on a semi-official basis, previously have announced that Ewing may disregard the recommendations of the assembly if he so desires. Heated debate marked early sessions on compulsory health insurance at the assembly's panel meeting on medical care. *Chicago Tribune*, May 3, 1948.

Twenty-sixth Physical Medicine Congress

THE American Congress of Physical Medicine will hold its twenty-sixth annual scientific and clinical session September 7, 8, 9, 10 and 11, inclusive, at the Hotel Statler, Washington, D. C. Scientific and clinical sessions will be given the days of September 7, 8, 9, 10 and 11. All sessions will be open to members of the medical profession in good standing with the American Medical Association. In addition to the scientific sessions, the annual instruction courses will be held September 7, 8, 9 and 10. These courses will be offered in two groups. One set of 10 lectures will be based primarily on physics and physiology, and attendance will be limited to physicians. One set of 10 lectures will be more general in character and will be open to physicians as well as to physical therapists. The physical therapists must be registered with the American Registry of Physical Therapy Technicians.

Full information may be obtained by writing to the American Congress of Physical Medicine, 30 North Michigan Avenue, Chicago 2, Illinois.

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Sickness Absenteeism

A RECENT study of 565 plants with 500 or fewer workers (in which category, incidentally, some 99% of all U. S. plants fall) turned up these facts: 75% did not maintain absentee records, 86% did not provide sick benefit plans, 88% did not undertake health education, 96% did not give pre-employment examinations, 97% did not provide for annual physical examinations, 99% did not provide chest x-rays, 99% did not give blood tests for syphilis, 99% did not have nursing care available. These figures, which are probably representative indicate that a large majority of plants fail to provide a minimum of medical attention. Yet on-the-job medical care, it has been shown, reduces sickness absenteeism up to 60%. A health program providing all of the services listed above enabled one New York firm to cut absenteeism to half. The program cost $400,000 but in the long run it actually saved $1,500,000 in lost time, to show a net profit annually of $1,100,000. Reports from 1,625 companies indicate that health programs accomplished an average annual saving of $30,510 for concerns employing 500 or less.

—From "Industry's Worst Enemy—Sickness," in *Commerce*, Chicago, March, 1948.

DR. PILGRIM

CONTINUING with activity at the office, in divers phases, working on various manuscripts and problems of employee exposure and effects, as well as plans for future journeys....AND enroute with MADAME PILGRIM to Kentucky where acting in an advisory capacity on community health problems relative to public liability, with conferences and hearings, and again meeting many old friends and new ones as well; and visiting at supper with JAMES GRAVES and his lady and later to DR. PAUL and ALICE TURNER for many reminiscences and original piano selection by request....AND, meantime, much reading of transcripts and briefs relative to precedents established by similar and other cases, while not neglecting the "important" reading, especially one of Erle Stanley Gardner's latest "The Case of the Lonely Heiress," of great interest because of its unusual plot; and reading also in

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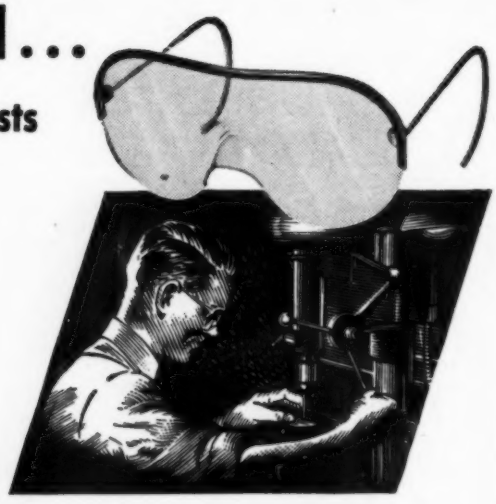

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"Adam's Rib" by Ruth Hershberger, a most unusual philosophy, to wit: "Where did the notion originate that a statistical majority promptly erects an esthetic standard of desirability?" which should be of at least passing interest to those whose only concern seems to be to "prove" something by enumeration alone, and without mature and well-considered interpretation. . . . AND again in western Kentucky to Louisville's famous Pendennis Club where were good food and drink and talk of everything except horses, which were so extensively displayed in photographs on the walls; and the town full of the young, all intent in centering on the armory where were played the basketball tournaments, drawing visitors from far and wide—crowds everywhere encountered; and after making official statements in the community health problem, enroute to Chicago and finding the domicile a comfort after the fortnight sojourn . . . . AND driving to the office for orientation, and finding many interesting developments of problems, among them certain old and new situations in Indiana, necessitating examination and study of considerable documentary material concerning the hygiene of soft coal mining; and thence to the medical advisers for the accustomed check-up and finding favorable commentary with much talk of details of the daily routine. . . . AND taking great pleasure in listening to the radio symphonies, especially Toscanini's all-Wagner program, with the New York Philharmonic, televised for the first time, while playing excerpts from Lohengrin, Tannhauser, Gotterdamerung and Walkyrie — which seemed to reach heights never attained before; and later hearing Dvorak's New World Symphony, seeming now to have great significance, in the turn of recent world events. . . . AND in regular reading of the current medical journals, an editorial in *AMA* on physical fitness as the physician sees it, and most impressed by the statement that "In the periodic health examination the emphasis must be placed 'on the dynamic state of the individual, rather than on the anatomic aspects of illness' "—which sounds familiar, in fact practically the same as the concepts generated by industrial physicians relative to periodic examinations of employees, and more specifically applied to recent health audits of executives. . . . AND planning for the journey to Boston and the annual health conferences of physicians, hygienists, nurses, and dentists, of which more later.

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Bottles of 12 fl. oz.
TABLETS
Tins of 12
Bottles of 100 and 500

Dose: 1 or 2 teaspoonfuls or tablets every 2 to 4 hours.

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Tricreamalate, trademark

Octin - for Relief of Smooth Muscle Spasm

Octin is an antispasmodic with both neurotropic and musculotropic action indicated for the treatment of smooth muscle spasm, particularly in spastic conditions of the genitourinary and gastrointestinal tracts. It acts promptly and the relaxation usually lasts three to five hours.

DOSE: Orally, one tablet (2 grains Octin mucate) every three to five hours.

Intramuscularly, ½ to 1 cc. (1 cc. ampule, 0.1 Gm., Octin HCl.) every three to four hours.

Octin, methylisooctenylamine, Trade Mark Bilhuber.

Bilhuber-Knoll Corp. Orange, N. J.

TENSOR* ELASTIC BANDAGE

IS WOVEN WITH

Live Rubber Thread

And that's the reason for TENSOR'S elasticity—TENSOR stretches to over twice its own length! *Live rubber* warp threads, sheathed in soft cotton yarn, "give" as bandaged parts move, yet provide therapeutic support.

Some common uses of TENSOR are shown at left. You'll find a host of others in your daily practice—and you can depend on TENSOR for efficient performance. Recommend TENSOR with confidence, for *any* elastic bandage use.

TENSOR has these advantages:

- exerts constant, controlled pressure without constriction.
- has *uniform elasticity*—rubberless bandages can't match its "stretch."
- *stays put*—no need for frequent readjustments; is comfortable to wear.
- *is inconspicuous*—women patients will wear TENSOR readily.
- withstands repeated laundering without loss of elasticity.

In 2 - 2½ - 3 - 4 and 6 inch widths by 5½ yards stretched.

*Reg. U. S. Pat. Off.

THERE IS NO BETTER ELASTIC BANDAGE THAN TENSOR!

A product of

BAUER & BLACK

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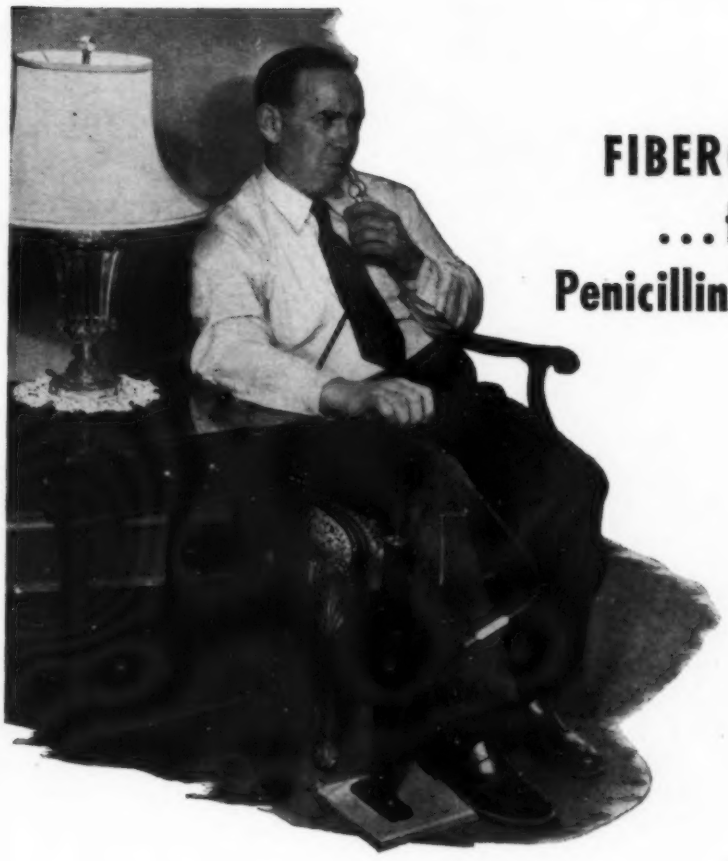

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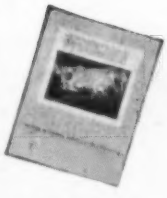
An inexpensive nebulization pump designed for simplifying penicillin aerosol therapy for home treatment has recently been reported †. A glass vial containing Fiberglas fibers is inserted at the end of the rubber hose of an ordinary bicycle pump and attached to this is a rubber tubing leading to the penicillin nebulizer. The Fiberglas fibers are used to filter the air when the pump is in operation. They help eliminate any foreign matter in the air stream and prevent plugging of the apparatus.

Several applications of standard Fiberglas products are described in the second edition of "Pioneering Uses of Fiberglas Materials in Medicine". Samples and a listing of the medically significant characteristics are also included.



Fiberglas may be helpful in some of your investigations or in solving some of your problems. Write for a copy of this interesting booklet today. Owens-Corning Fiberglas Corporation, Department 2029, Toledo 1, Ohio. Branches in principal cities.

In Canada: Fiberglas Canada Ltd., Toronto, Ontario.

†Finke, Walter, M.D., Simplification of penicillin aerosol therapy for home treatment, American Practitioner 1: 643-644, Aug. 1947.

*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) for a variety of products made of or with glass fibers by Owens-Corning Fiberglas Corporation.

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FIBERGLAS

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NON-IRRITATING
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*Solubase Brand

1. New England J. Med. 213:279

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Acetone Test (DENCO) FOR DETECTION OF ACETONE IN THE URINE

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Acetone Test (DENCO)... Galatest

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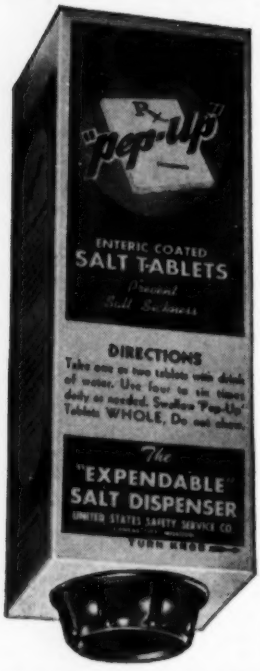

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For the temporary support of reducible hernia, or for cases of inoperable nature, the Web Truss provides maximum comfort with adequate support for single or double hernia. Improved design and construction exert beneficial massaging effect, without devitalizing pressure on weakened muscles. The Web Truss has been found effective and safe when used on both pre-operative and post-operative cases. Doctors are urged to examine this improved support which overcomes most of the objections to the conventional type of truss.

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H V C is a nontoxic antispasmodic and sedative that can be given to relieve any smooth muscle spasm. It is widely prescribed by physicians for dysmenorrhea and metrorrhagia and is also frequently administered as a general antispasmodic. Is frequently given for abdominal cramps since it contains nothing that can mask a symptom.

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QUESTION:

When is it good practice to suggest "Change to Philip Morris Cigarettes"?

ANSWER:

When patients under treatment for throat conditions persist in smoking, many eminent nose and throat specialists suggest *"Change to Philip Morris"** ...the *only* cigarette proved** less irritating.

- ***In fact, for all smokers, it is good practice to suggest "Change to Philip Morris."***

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DO YOU SMOKE A PIPE? . . . We suggest an unusually fine new blend — COUNTRY DOCTOR PIPE MIXTURE. Made by the same process as used in the manufacture of Philip Morris Cigarettes.

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Laryngoscope, Feb. 1935, Vol. XLV, No. 2, 149-154; Laryngoscope, Jan. 1937, Vol. XLVII, No. 1, 58-60; Proc. Soc. Exp. Biol. and Med., 1934, 32-241; N. Y. State Journ. Med., Vol. 35, 6-1-25, No. 11, 590-592.

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Rx DESITIN OINTMENT

The External Cod-Liver Oil Therapy

USED EFFECTIVELY IN THE TREATMENT OF

Wounds, Burns, Ulcers, especially of the Leg, Intertrigo, Eczema, Tropical Ulcer, also in the Care of Infants

Desitin Ointment contains Cod-Liver Oil, Zinc Oxide, Petrolatum, Lanum and Talcum. The Cod-Liver Oil, subjected to a special treatment which produces *stabilization* of the Vitamins A and D and of the unsaturated fatty acids, forms the active constituent of the Desitin Preparations. The first among cod-liver oil products to possess unlimited keeping qualities, Desitin, in its various combinations, has rapidly gained prominence in all parts of the globe.

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DESITIN POWDER

Indications: Minor Burns, Exanthema, Dermatitis, Care of Infants, Care of the Feet, Massage and Sport purposes.

Desitin Powder is saturated with cod-liver oil and does not therefore deprive the skin of its natural fat as dusting powders commonly do. Desitin Powder contains Cod-Liver Oil, (with the maximum amounts of Vitamins and unsaturated fatty acids) Zinc Oxide and Talcum.

Professional literature and samples for Physicians' trial will be gladly sent upon request.

Sole Manufacturer and Distributor in U. S. A.

DESITIN CHEMICAL COMPANY

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IN ARTHRITIS

INITIATE CONVALESCENCE

by Intestinal Care (1)

TOXIN ABSORPTION from the stagnant intestine and marked colonic stasis[2], functional impairment of the hepatic system[3], and sulfur depletion[4] preventing thorough systemic inactivation of toxins... are increasingly incriminated as factors involved in the arthritic syndrome. With their relief surprising results have occurred in the initiation of convalescence. • The administration of Occy-Crystine to arthritics is therefore highly logical, in that it effectively steps up the excretion of intestinal poisons by prompt, thorough catharsis... increases renal waste elimination through profuse diuresis... aids in the normalization of hepato-biliary function ...and releases colloidal sulfur in the stomach for better toxicopexis.

REFERENCES: 1. Spackman, E.W. et al., Am. J. Med. Sc., 202:68, 1941. 2. Bassler, A., Med. Rec., 153:20, 1941. 3. Rawls, W.B. et al., Ann. Int. Med., 12:1455, 1939. 4. Weissman, S., Clin. Med., 51:5, 1944.

FORMULA: Occy-Crystine is a hypertonic solution made up of the following active ingredients: sodium thiosulfate and magnesium sulfate, to which the sulfates of potassium and calcium have been added in small amounts, contributing to the maintenance of solubility.

Free trial supply available to physicians on request

OCCY-CRYSTINE LABORATORY • SALISBURY, CONN.

OCCY-CRYSTINE

THE SULFUR-BEARING DETOXICANT ELIMINANT

Why One Fourth to One Third?

In the minds of most persons, the size of both luncheon and dinner is fairly well established. Yet the breakfast these very same individuals eat is subject to great variation—from a large meal when a leisurely breakfast can be enjoyed to a totally inadequate meal when time is short. Not only adults, but many teen-age children, are guilty of this practice of eating a poor breakfast or skipping breakfast entirely.

Nutrition authorities are agreed that breakfast should provide from one-fourth to one-third of the day's caloric and nutrient needs. If less is eaten, morning hunger and inefficiency develop. Furthermore the other two meals of the day can hardly supply the nutrients and calories the deficient breakfast failed to provide.

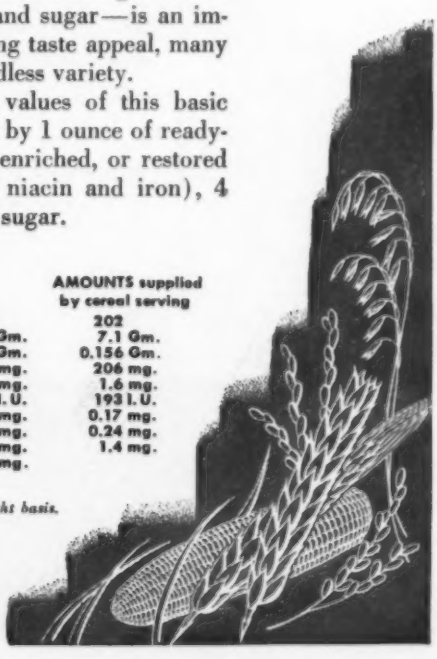
To encourage better breakfast eating habits, a basic breakfast pattern consisting of fruit, cereal, milk, bread and butter has been widely endorsed. It provides a nutritionally adequate morning meal, is notably economical, and is universally available. The cereal serving—hot or ready-to-eat breakfast cereal, milk, and sugar—is an important main dish of this meal, adding taste appeal, many nutritional essentials, and almost endless variety.

The table indicates the nutrient values of this basic breakfast and the contribution made by 1 ounce of ready-to-eat or hot cereal* (whole grain, enriched, or restored to whole grain values of thiamine, niacin and iron), 4 ounces of milk and 1 teaspoonful of sugar.

The presence of this seal indicates that all nutritional statements in this advertisement have been found acceptable by the Council on Foods and Nutrition of the American Medical Association.

BASIC BREAKFAST	TOTALS supplied by Basic Breakfast	AMOUNTS supplied by cereal serving
Orange juice, 4 oz.;	CALORIES..... 611	202
Ready-to-eat or Hot Cereal, 1 oz.;	PROTEIN..... 20.7 Gm.	7.1 Gm.
Whole Milk, 4 oz.;	CALCIUM.....0.465 Gm.	0.156 Gm.
Sugar, 1 teaspoon;	PHOSPHORUS .... 488 mg.	206 mg.
Toast (enriched, white), 2 slices;	IRON ..... 3 mg.	1.6 mg.
Butter, 5 Gm. (about 1 teaspoon);	VITAMIN A ..... 1074 I.U.	193 I.U.
Whole Milk, 8 oz.	THIAMINE..... 0.52 mg.	0.17 mg.
	RIBOFLAVIN..... 0.87 mg.	0.24 mg.
	NIACIN ..... 2.3 mg.	1.4 mg.
	ASCORBIC ACID .. 64.8 mg.	

* *Composite average of all breakfast cereals on dry weight basis.*



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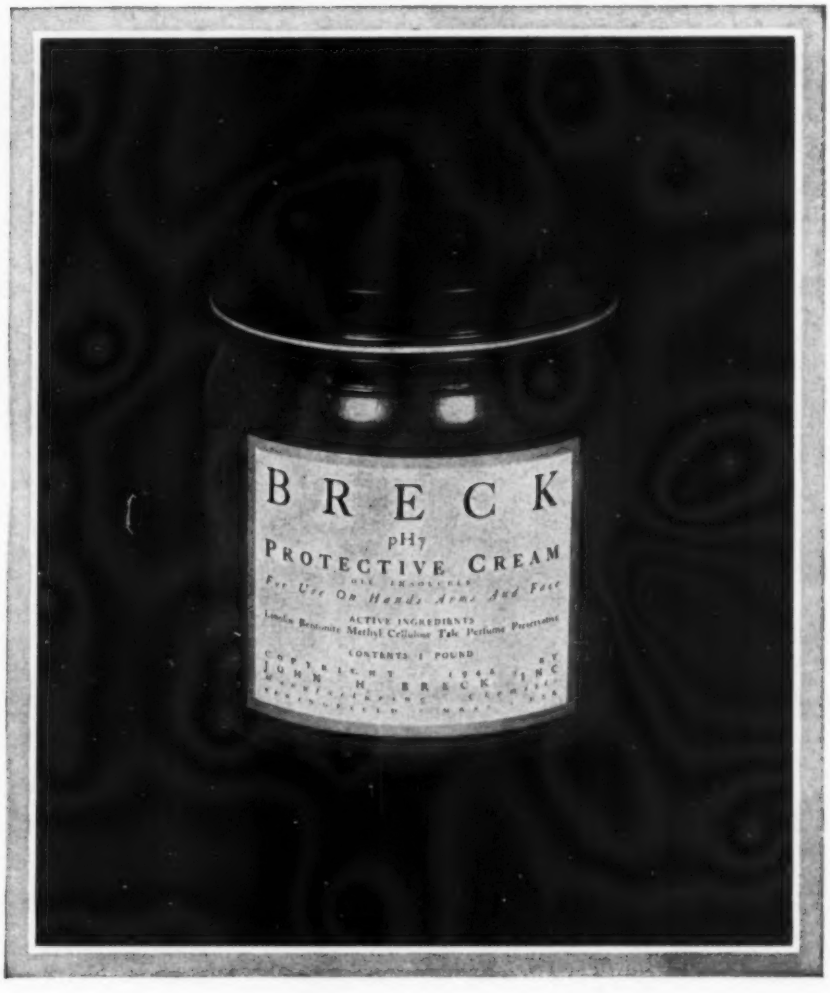

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Minor skin eruptions or irritations of the hands are often caused from using harsh soaps and detergents. Breck pH7 Protective Cream keeps dirt and grime from becoming embedded in the skin. Only mild soap and water are necessary to remove Breck pH7 Protective Cream. Physicians may want to recommend this type of protection to those whose work requires the use of harsh cleansing agents.

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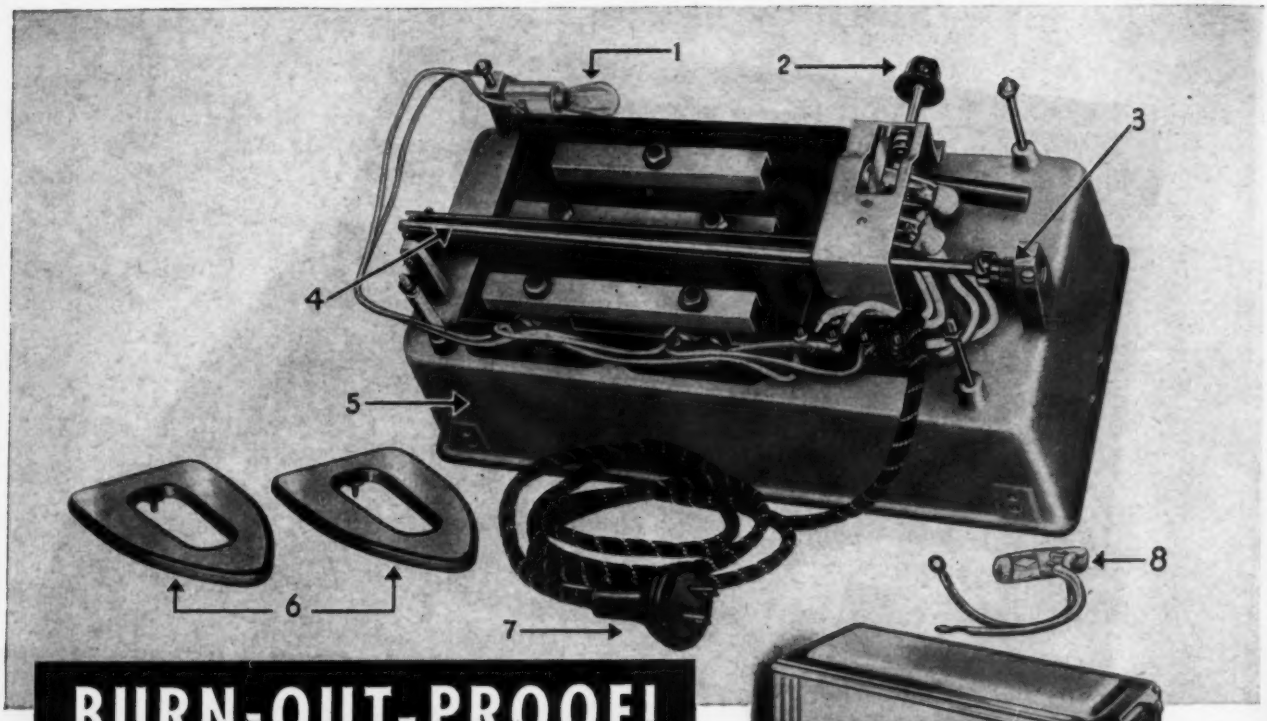

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A safety measure protecting both sterilizer and instruments featured exclusively in

AMERICAN SMALL INSTRUMENT STERILIZERS

8 mechanical features of primary importance

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available in three practical sizes

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The "American" Small Instrument Sterilizer provides automatic "burn-out-proof" safety. If water becomes exhausted below the critical level, a complete automatic cut-off of current occurs. Functional operation can only be resumed by replenishing water in the chamber and manually switching on the current again.

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Erie, Pennsylvania

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Aqueous Suspension
of Mineral Oil
Plain
Active
Ingredient
Mineral Oil 65%
DIRECTIONS—Adults: One table-
spoonful. Children: One teaspoonful.
Important—Do not take directly
before or after a meal.
May be thinned with water, milk or
fruit juice if desired.
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Made in U. S. A.
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IN CHRONIC ARTHRITIS

EFFECTIVENESS?

In ALL published cases (*) of chronic arthritis treated with Ertron since 1936, in which results were clinically evaluated (852) — significant improvement was reported in 701 cases . . . or 82.2%.

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In ALL published cases (*) of chronic arthritis treated with Ertron since 1936, in which toxicity was considered (1,020) — severe toxicity was reported in only 14 cases . . . or 1.4%. Medication without physician control accounted for a majority of these toxic findings.

What other treatment for chronic arthritis can equal this record?

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ERTRON is a Registered Trade Mark of Nutrition Research Laboratories

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Each capsule of Ertron contains 5 milligrams of activation-products having antirachitic activity of fifty thousand U.S.P. units. Biologically standardized.

ERTRON

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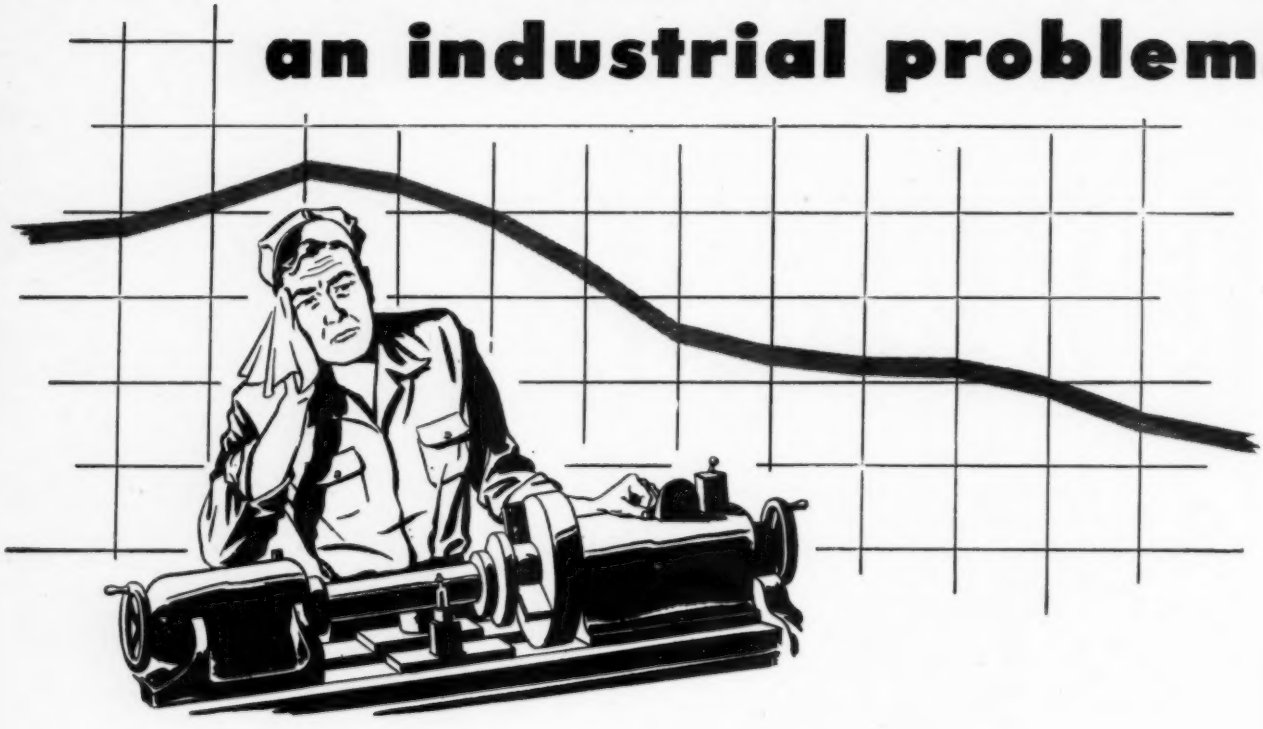
NUTRITION RESEARCH LABORATORIES

CHICAGO

When constipation becomes an industrial problem!



Sluggishness often is a cause of inefficient, non-productive workers—workers who fall below production standards and increase the danger of industrial accidents.

Where sluggishness results from faulty elimination, we suggest TAXOL—the mild, non-griping laxative—for relief from continued constipation.

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FLEXIBLE DOSAGE—Depending upon individual need, 1 to 6 tablets daily, swallowed without chewing, before meals or at bedtime. Any laxative is contraindicated if symptoms of appendicitis or intestinal obstruction are present.

TAXOL

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That RIASOL points to relief in psoriasis is attested by physician and patient alike. In fact, results are so satisfactory to both the doctor and his patient that this outstanding therapeutic formula is fast becoming the prescription of choice in psoriasis.

Among the many agents employed in treating psoriasis RIASOL stands out because it:

- ★ Aids in healing ugly psoriatic lesions.
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- ★ Is simple, pleasant and convenient to use.
- ★ Provides cosmetic relief, thus restoring self-confidence.

RIASOL contains 0.45% mercury chemically combined with soaps, 0.5% phenol and 0.75% cresol in a washable, non-staining, odorless vehicle.

Apply daily after a mild soap bath and thorough drying. A thin, invisible, economical film suffices. No bandages necessary.

RIASOL is ethically promoted. Supplied in 4 and 8 fld. oz. bottles, at pharmacies or direct.

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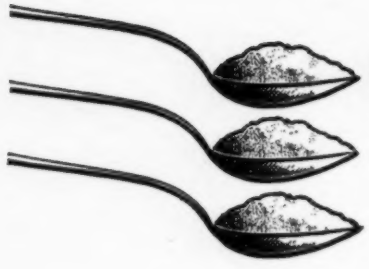
*Aperient

*Laxative



*Cathartic

*Average dose

a balanced saline combination which acts by simple osmosis to dilute fecal residue and produce soft fluid bulk....
stimulates peristalsis and promotes speedy but gentle evacuation
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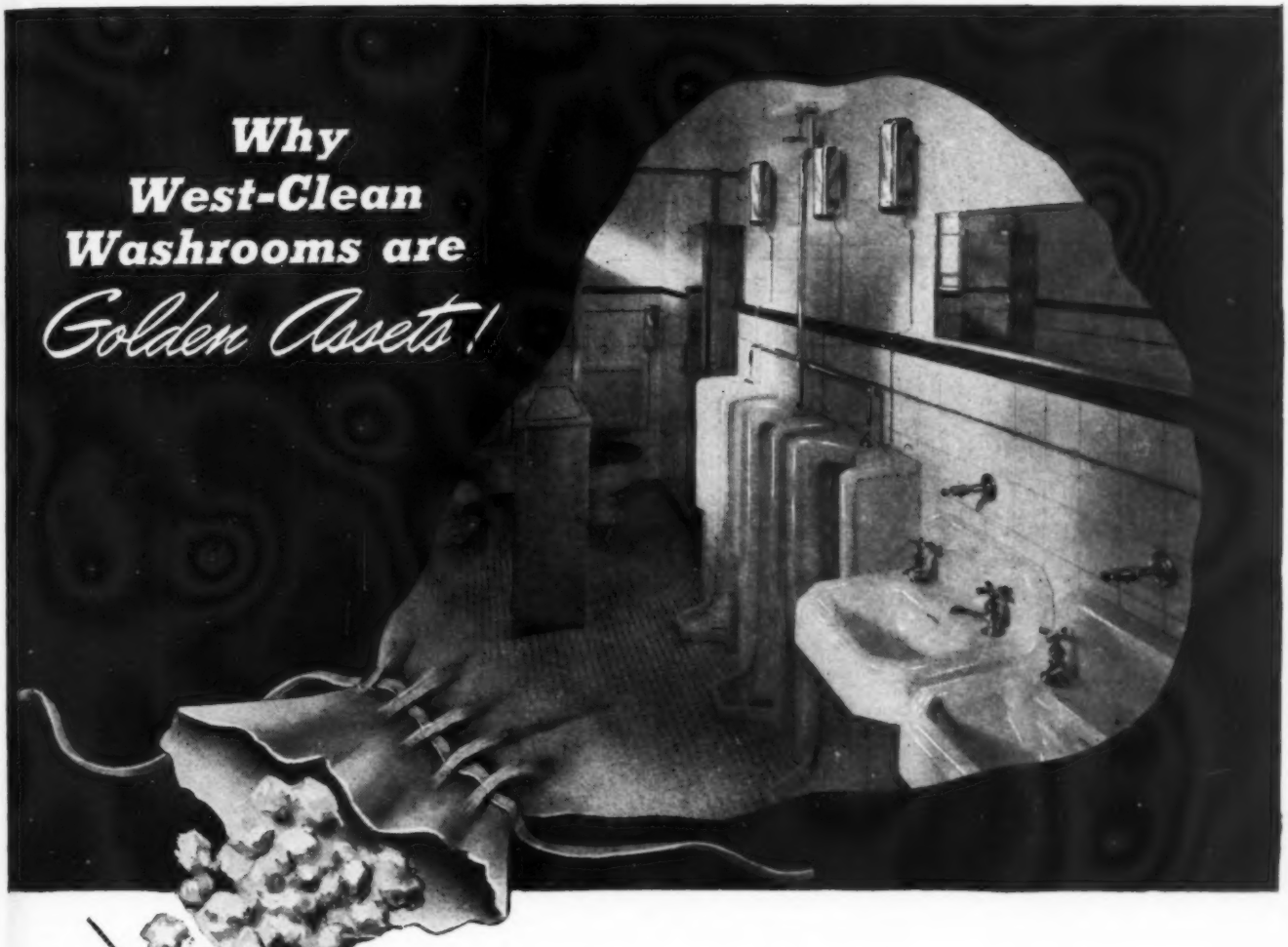

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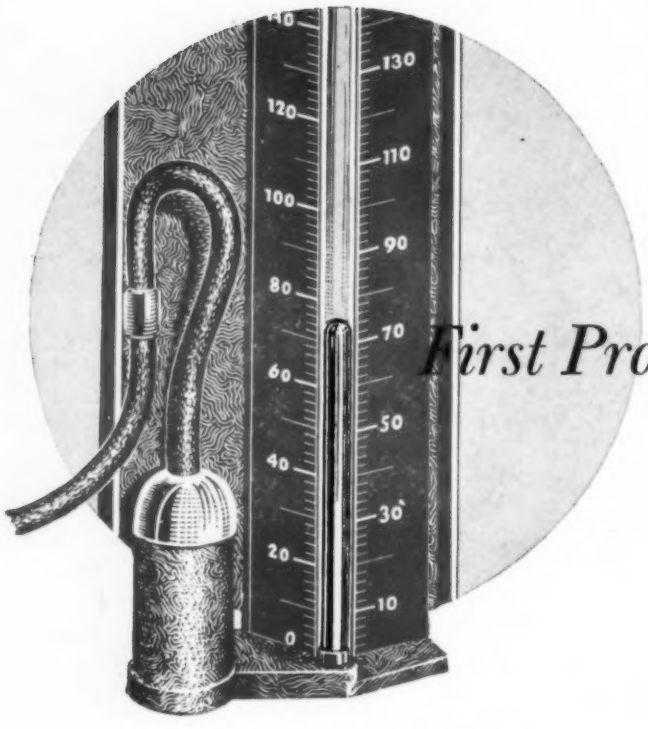

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at least 5cc. of CORAMINE

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Both intramuscular and venous pressure increase dramatically, the effect usually persisting for several hours. Thus Coramine constitutes the ideal initial therapy . . . providing time for other treatment such as administration of plasma or blood.*

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Ampuls: 1.5 *cc. cartons of* 5 *and* 20.
Liquid: Bottles of ½, 1½ *and* 3 *fl. ounces.*

*Gunther, Engelberg, and Strauss: Am. Jl. of Med. Sci. 204: 271, 1942

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